VOLUME 21 / NUMBER 20
OCTOBER 23, 1983
ACC. NOS. N83-31569 TO N83-32706

Astro.
The University of Michigan Astronomy Library
ROOM USE
DEC 2 1 1983
Astronomy
TL
501
.S42
V.21
No20

STAR

AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

UNIVERSITY OF MICHIGAN
LIBRARIES
DEC 8 1983
DEPOSITED BY THE
UNITED STATES OF AMERICA

25th Anniversary
1958-1983

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts.*

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available postpaid on subscription and in single copy from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, United States of America.

Semimonthly issues...

Annual subscription rates: $90.00 domestic; $112.00 foreign. Price per single copy: $4.75 domestic; $5.95 foreign.

Annual index issues...

Pricing based upon pagination.

Domestic subscription rates...

Apply to the United States, Canada, Mexico, and all Central and South American countries, except as noted below.

Foreign subscription rates...

Apply to Argentina, Brazil, French Guiana, Guyana, Surinam, Belize, and all other countries throughout the world.

Payment should be by check, money order, or document coupons, and must accompany order. Remittances from foreign countries should be made by international money order or draft on an American bank, payable to the Superintendent of Documents, or by UNESCO book coupons.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 21, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through February 28, 1985.

US ISSN 0036-8741

NAS 1.9/4:21/20

830-K

INTRODUCTION

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche(1) are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($7.00 domestic; $14.00 foreign). Microfiche are sold at price code A01 ($4.50 domestic; $9.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
ATTN: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $60.00 North America; $120.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NIT-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library
National Center – MS 950
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, Arizona 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS 914
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.50	$ 9.00
A02	001-025	7.00	14.00
A03	026-050	8.50	17.00
A04	051-075	10.00	20.00
A05	076-100	11.50	23.00
A06	101-125	13.00	26.00
A07	126-150	14.50	29.00
A08	151-175	16.00	32.00
A09	176-200	17.50	35.00
A10	201-225	19.00	38.00
A11	226-250	20.50	41.00
A12	251-275	22.00	44.00
A13	276-300	23.50	47.00
A14	301-325	25.00	50.00
A15	326-350	26.50	53.00
A16	351-375	28.00	56.00
A17	376-400	29.50	59.00
A18	401-425	31.00	62.00
A19	426-450	32.50	65.00
A20	451-475	34.00	68.00
A21	476-500	35.50	71.00
A22	501-525	37.00	74.00
A23	526-550	38.50	77.00
A24	551-575	40.00	80.00
A25	576-600	41.50	83.00
A99	601-up	-1	-2

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50

E-99 - Write for quote

N01	35.00	45.00

VOLUME 21 NUMBER 20/OCTOBER 23, 1983

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 3233

02 AERODYNAMICS 3234

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY 3236

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 3236

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications.*

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 3237

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

06 AIRCRAFT INSTRUMENTATION 3238

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

07 AIRCRAFT PROPULSION AND POWER 3238

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

08 AIRCRAFT STABILITY AND CONTROL 3239

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 3239

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) 3241

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

13 ASTRODYNAMICS N.A.

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) 3252

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air).*

15 LAUNCH VEHICLES AND SPACE VEHICLES 3253

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION 3253

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING N.A.

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 3254

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

19 SPACECRAFT INSTRUMENTATION N.A.

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

20 SPACECRAFT PROPULSION AND POWER 3255

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) 3256
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 3256
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 3259
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics.*

26 METALLIC MATERIALS 3267
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 3276
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 3281
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics.*

31 ENGINEERING (GENERAL) 3282
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 3285
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

33 ELECTRONICS AND ELECTRICAL ENGINEERING 3291
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuity.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

34 FLUID MECHANICS AND HEAT TRANSFER 3297
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

35 INSTRUMENTATION AND PHOTOGRAPHY 3303
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation.*

36 LASERS AND MASERS 3306
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 3310
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 3311
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 3312
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) 3317

43 EARTH RESOURCES 3318
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION 3325
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

45 ENVIRONMENT POLLUTION 3327
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 3329
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY 3334
Includes weather forecasting and modification.

48 OCEANOGRAPHY 3338
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) **3340**
Includes genetics.

52 AEROSPACE MEDICINE **3342**
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES **3344**
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT **3346**
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY **N.A.**
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) **3347**

60 COMPUTER OPERATIONS AND HARDWARE **3350**
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE **3351**
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS **3357**
Includes computer networks.

63 CYBERNETICS **3357**
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS **3358**
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY **3367**
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS **3369**
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS **N.A.**
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) **3370**
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS **3375**
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS **3377**
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS **3383**
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS **3385**
Includes light phenomena.

75 PLASMA PHYSICS **3388**
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS **3390**
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS **3396**
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) **3396**
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT **3396**
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE 3400
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS 3400
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE 3401
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION 3402
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) 3402

89 ASTRONOMY 3402
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS 3403
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION 3403
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS 3403
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION 3404
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

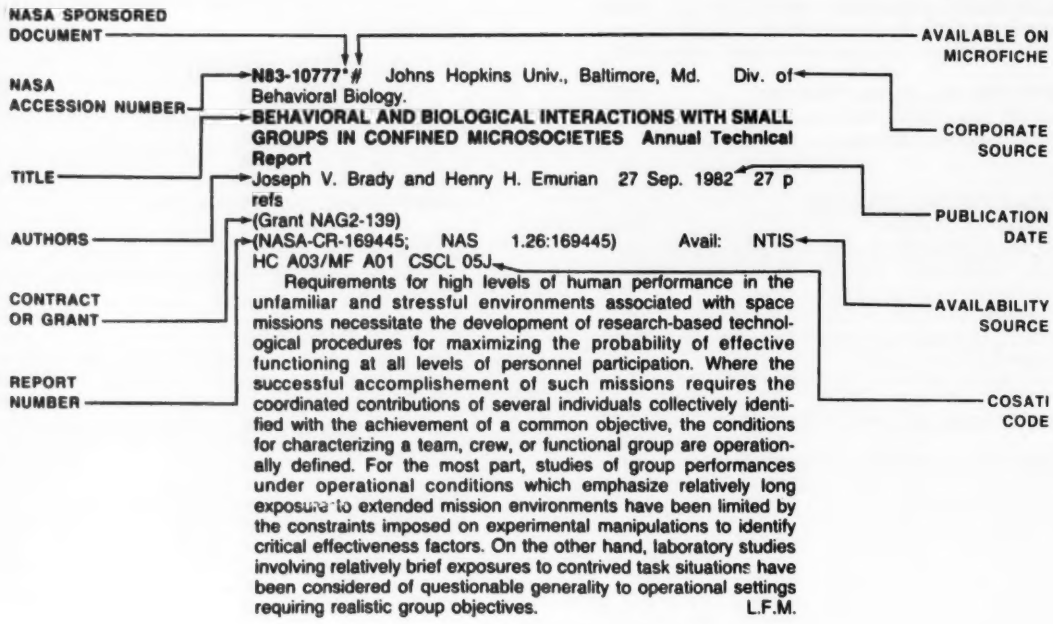
GENERAL

99 GENERAL 3405

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX I-1
PERSONAL AUTHOR INDEX I-63
CORPORATE SOURCE INDEX I-73
CONTRACT NUMBER INDEX I-89
REPORT/ACCESSION NUMBER INDEX I-93

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N83-10777*# Johns Hopkins Univ., Baltimore, Md. Div. of Behavioral Biology.
CORPORATE SOURCE
TITLE
BEHAVIORAL AND BIOLOGICAL INTERACTIONS WITH SMALL GROUPS IN CONFINED MICROSOCIETIES Annual Technical Report
AUTHORS
Joseph V. Brady and Henry H. Emurian 27 Sep. 1982 27 p refs
PUBLICATION DATE
CONTRACT OR GRANT
(Grant NAG2-139)
REPORT NUMBER
(NASA-CR-169445; NAS 1.26:169445) Avail: NTIS HC A03/MF A01 CSCL 05J
AVAILABILITY SOURCE
COSATI CODE
Requirements for high levels of human performance in the unfamiliar and stressful environments associated with space missions necessitate the development of research-based technological procedures for maximizing the probability of effective functioning at all levels of personnel participation. Where the successful accomplishement of such missions requires the coordinated contributions of several individuals collectively identified with the achievement of a common objective, the conditions for characterizing a team, crew, or functional group are operationally defined. For the most part, studies of group performances under operational conditions which emphasize relatively long exposure to extended mission environments have been limited by the constraints imposed on experimental manipulations to identify critical effectiveness factors. On the other hand, laboratory studies involving relatively brief exposures to contrived task situations have been considered of questionable generality to operational settings requiring realistic group objectives. L.F.M.

VOLUME 21 NUMBER 20/OCTOBER 23, 1983

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N83-31569# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
THE F-4C/D LIFE EXTENSION PROGRAM Final Report, Oct. 1974 - May 1981
Robert L. Schneider Oct. 1982 119 p refs
(AF Proj. 327A)
(AD-A127495; AFWAL-TR-82-3047) Avail: NTIS HC A06/MF A01 CSCL 01/3

The F-4 airframe was designed over 20 years ago for a service life of 4000 flight hours projected to be sufficient to complete the era of its usefulness in the inventory in both the USN and the USAF. However, the F-4 aircraft was slated to continue service well beyond the time when it was to have been replaced. Some 4000 F-4 aircraft are currently retained in service by the USN, USAF, and allied nations. With fatigue problems occurring in the fleet and the need for the aircraft throughout the 1980's time period, a structural integrity program was initiated to extend the life of the F-4 aircraft from 4000 hours to 8000 hours. The most comprehensive airframe fatigue test program ever conducted by the Air Force, sponsored by the Aeronautical Systems Division and the Ogden Air Logistic Center, was initiated in January 1976 by the Structures Test Branch Structures and Dynamics Division, of the Flight Dynamics Laboratory. This test program was successfully completed in April 1981 after the F-4 airframe has sustained 24,000 simulated flight hours. Actual testing and inspection accounted for only 21 months of this 63 month period, most of which was spent awaiting the design, fabrication and installation of structural modifications required to extend the service life of the F-4 aircraft. A major achievement for the test program was the physical proof that the modified structure did indeed provide the required life extension. GRA

N83-31570# Hughes Aircraft Co., El Segundo, Calif. Electro-Optical and Data Systems Group.
STUDY OF THE CAUSES OF UNNECESSARY REMOVALS OF AVIONIC EQUIPMENT Final Technical Report, 7 Jul. 1979 - 30 Sep. 1980
H. D. Rue and R. O. Lorenz Griffiss AFB, N.Y. RADC Jan. 1983 213 p refs
(Contract F30602-79-C-0200; AF Proj. 2338)
(AD-A127546; RADC-TR-83-2; HAC-FR-80-70-1135R3) Avail: NTIS HC A10/MF A01 CSCL 05/1

This study investigated and verified the causes of unnecessary removals of suspect items from selected avionic equipment. During the study, the selected equipment average unnecessary removal rate was found to be 32.7% of all removals. The study report contains conclusions and recommendations useful in minimizing unnecessary removals. Author (GRA)

N83-31571# Air Force Academy, Colo. Dept. of Aeronautics.
AIR FORCE ACADEMY AERONAUTICS DIGEST, SPRING/SUMMER 1982 Final Report
Jay DeJongh, A. M. Higgins, James M. Kempf, Eric J. Jumper, and Martha Arends Mar. 1983 167 p
(AD-A128248; USAFA-TR-83-2) Avail: NTIS HC A08/MF A01 CSCL 01/1

This Digest covers unclassified research in aeronautics performed at the United States Air Force Academy during the six months ending 15 August 1982. This report includes technical papers in the specific areas of aerodynamics, propulsion, experimental instrumentation, engineering education, and aeronautical history. Author (GRA)

N83-31572# Raychem Corp., Menlo Park, Calif.
COMBAT MAINTENANCE CONCEPTS AND REPAIR TECHNIQUES USING SHAPE MEMORY ALLOYS FOR FLUID LINES, CONTROL TUBES AND DRIVE SHAFTS Final Report, 27 Sep. 1979 - 31 Sep. 1982
J. R. Yaeger Mar. 1983 49 p
(Contract DAAK51-79-C-0059; DA Proj. 1L1-62209-AH-76)
(AD-A127826; USAAVRADCOM-TR-82-D-37) Avail: NTIS HC A03/MF A01 CSCL 01/3

This report describes the design and testing of couplings fabricated from shape-memory brass (Betalloy) and used for the repair of helicopter battle-damaged hydraulic lines (rigid and flexible), control tubes, and drive shafts. Flameless heaters were investigated for fueled aircraft. Hydraulic rigid couplings generally exceeded the strength of the tubing. Flexible couplings were sensitive to installation. C-type couplings for nonsevered damaged tubing added to the strength significantly but were difficult to fabricate large enough to fit over the tubing without cutting the tube. Author (GRA)

N83-31573# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
EFFECT OF TEST RESULT UNCERTAINTY ON THE PERFORMANCE OF A CONTEXT-FREE TROUBLESHOOTING TASK M.S. Thesis
Harry A. Baran 17 Dec. 1982 103 p refs
(AD-A128584; AFIT/LSSR-86-82) Avail: NTIS HC A06/MF A01 CSCL 15/5

A major problem affecting weapon system support cost and operational capability is the 20-40% troubleshooting error rate experienced by the Air Force and the Navy for all aircraft corrective maintenance actions. Most fault detection problems resemble the problem of signal detection in a background of noise, or in the case of troubleshooting, test result uncertainty. This thesis attempted to determine whether human bias exists under conditions of test result uncertainty such that troubleshooting performance is systematically affected. A knowledge of such bias might be useful in assessing the utility of powerful signal detection-in-noise analytical tools, e.g., the Relative Operating Characteristic (ROC) curve analysis, to improve predictions of troubleshooting performance, and reduce troubleshooting error by allowing man-machine troubleshooting systems to be optimized on the basis of the response characteristics of both machine and man. The experiment consisted of sixty-four subjects performing a simulated

electronics troubleshooting task at four levels of test result error; zero error, 25% error, 50% good called bad error, and 50% bad called good error. Results did not indicate the existence of significant differences in troubleshooting performance under the latter three treatment conditions; only between the first and any of the latter three. Author (GRA)

N83-31574# Management Consulting and Research, Inc., Falls Church, Va.
SUMMARY OF ANALYSIS OF SOURCES OF FORECASTING ERRORS IN BP 1500 REQUIREMENTS ESTIMATING PROCESS AND DESCRIPTION OF COMPENSATING METHODOLOGY Interim Report
Patricia A. Insley, William P. Hutzler, Gerald R. McNichols, and George H. Worm 25 Apr. 1982 89 p ref
(Contract F33615-81-C-5018)
(AD-A128548; MCR-TR-8104-3) Avail: NTIS HC A05/MF A01 CSCL 15/5

The researchers developed a methodology for improving the accuracy of the Air Force Logistics Command (AFLC) forecasts of Aircraft Replenishment Spares (BP 1500) POM requirements. The research was divided into three phases: (1) Develop a program plan for accomplishing the study; (2) Examine the AFLC BP 1500 POM (Program Management Memorandum) forecasting process and identify sources of errors and recommend changes; and (3) Develop and demonstrate a methodology for improving the AFLC forecasting accuracy for BP 1500 POM requirements. GRA

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N83-31575 British Aerospace Aircraft Group, Kingston-upon-Thames (England).
SCALING LAWS FOR VORTEX INDUCED DEBRIS INGESTION INTO AIR INTAKES
C. L. Bore Mar. 1983 8 p ref
(BAe-KRS-N-GEN-274) Copyright. Avail: Issuing Activity

The scaling laws for the formation of a vortex and for the debris lifting capacity of the vortex, when a jet engine air intake is near the ground surface, are discussed. It is assumed that the geometry of the model is similar to the full seal configuration. A vortex may develop if the vorticity in the ambient atmospheric air is sufficiently great, with angular velocity proportional to the mass flow into the intake and inversely proportional to the intake area. The vortex strength is shown to be proportional to the vorticity per unit cross section of the ambient atmosphere. Equations which can be used to achieve scaled height projection of model stores in vortex debris ingestion experiments are developed. Author (ESA)

N83-31576*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Aerospace and Ocean Engineering.
AN EXPERIMENTAL STUDY OF PRESSURES ON 60 DEG DELTA WINGS WITH LEADING EDGE VORTEX FLAPS Final Report
James F. Marchman, III, James E. Terry, and Denise A. Donatelli 30 Jun. 1983 121 p refs
(Grant NAG1-274)
(NASA-CR-172833; NAS 1.26:172833) Avail: NTIS HC A06/MF A01 CSCL 01A

An experimental study was conducted in the Virginia Tech Stability Wind Tunnel to determine surface pressures over a 60 deg sweep delta wing with three vortex flap designs. Extensive pressure data was collected to provide a base data set for comparison with computational design codes and to allow a better understanding of the flow over vortex flaps. The results indicated that vortex flaps can be designed which will contain the leading edge vortex with no spillage onto the wing upper surface. However, the tests also showed that flaps designed without accounting for flap thickness will not be optimum and the result can be oversized flaps, early flap vortex reattachment and a second separation and vortex at the wing/flap hinge line. Author

N83-31577*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WIND-TUNNEL INVESTIGATION OF LEADING-EDGE THRUST ON ARROW WINGS IN SUPERSONIC FLOW
Robert J. Mack Aug. 1983 80 p refs
(NASA-TP-2167; L-15535; NAS 1.60:2167) Avail: NTIS HC A05/MF A01 CSCL 01A

Six wing models were tested in the Langley Unitary Plan Wind Tunnel to identify and study leading-edge thrust at supersonic speeds. The tests were conducted at Mach numbers of 1.6, 1.8, 2.0, and 2.16, at a stagnation temperature of 125.0 F, and at Reynolds numbers per foot of 2.0 x 10 to the 6th power and 5.0 x 10 the 6th power. Test results showed that significant benefits from leading-edge thrust and nonlinear thickness effects can be obtained with very little airfoil bluntness, that these benefits were lost when the airfoil was severely blunted, and that such benefits seem to be found on wings with supersonic as well as subsonic leading edges. Author

N83-31578*# Informatics General Corp., Palo Alto, Calif.
IMPROVED METHOD FOR TRANSONIC AIRFOIL DESIGN-BY-OPTIMIZATION
Robert A. Kennelly, Jr. Jun. 1983 14 p refs
(Contract NAS2-11555)
(NASA-CR-166497; NAS 1.26:166497; TN-11555-307-8) Avail: NTIS HC A02/MF A01 CSCL 01A

An improved method for use of optimization techniques in transonic airfoil design is demonstrated. FLO6QNM incorporates a modified quasi-Newton optimization package, and is shown to be more reliable and efficient than the method developed previously at NASA-Ames, which used the COPES/CONMIN optimization program. The design codes are compared on a series of test cases with known solutions, and the effects of problem scaling, proximity of initial point to solution, and objective function precision are studied. In contrast to the older method, well-converged solutions are shown to be attainable in the context of engineering design using computational fluid dynamics tools, a new result. The improvements are due to better performance by the optimization routine and to the use of problem-adaptive finite difference step sizes for gradient evaluation. Author

N83-31579*# National Aeronautics and Space Administration, Washington, D. C.
CONTRIBUTION TO THE AERODYNAMIC STUDY OF WINGS AND PROPELLERS
Maurice Menard Jun. 1983 80 p refs Transl. into ENGLISH of "Contribution a l'Etude Aerodynamique de l'Aile et de l'Helice" rept. Publ. Sci. et Tech. 262 Ministere de l'Air, Inst. Aerotechnique de Saint-Cyr, Paris, 1952 p 1-61 Transl. by Scientific Translations Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-77083; NAS 1.15:77083) Avail: NTIS HC A05/MF A01 CSCL 01A

Various problems regarding the aerodynamics of lifting wings are solved. Two methods are proposed for replacing the wing, both involving 'viscous' edge vortices. the applications give results which agree well with experiments. Two new methods are also proposed for calculating propellers based on the vortex model consisting of an edge vortex and a 'viscous' hub vortex. Author

N83-31580# McDonnell-Douglas Automation Co., St. Louis, Mo.
INVESTIGATION OF LIMIT CYCLE RESPONSE OF AERODYNAMIC SURFACES WITH STRUCTURAL NONLINEARITIES Final Report, 1 Apr. - 31 Oct. 1982
Ronald P. Briley and John L. Gubser 1 Oct. 1983 65 p refs
(Contract F49620-82-C-0043; AF Proj. 2307)

(AD-A127140; AFOSR-83-0232TR) Avail: NTIS HC A04/MF A01 CSCL 20/4

Aerodynamic surface design must often account for the presence of structural nonlinearities induced by freeplay in the support structure and/or control actuators. During this study, application of asymptotic expansion methods to predict the limit cycle behavior of aerodynamic surfaces with; structural nonlinearities was investigated. Two basic types of nonlinearities, freeplay and preload, were introduced at the aerosurface support structure and the resulting limit cycle behavior analyzed. The asymptotic expansion method was used to derive a relationship between the parameters characterizing the structural nonlinearity and the amplitude and frequency of the limit cycle response. The results of this investigation show that the asymptotic solutions accurately predict the stationary limit cycle behavior when compared with numerical simulation and describing-function analyses for the nonlinearities considered. The influence of higher harmonics on the predicted limit cycle response were also observed when higher order perturbation solutions were obtained. This study demonstrates the applicability of the asymptotic expansion method in accounting for the influence of structural nonlinearities in the limit cycle analysis of aerodynamic surfaces. GRA

N83-31581# Notre Dame Univ., Ind. Aerodynamics Lab.
AERODYNAMICS OF AIRFOILS SUBJECT TO THREE-DIMENSIONAL PERIODIC GUSTS Final Report, 1 Jan. 1981 - 31 Jul. 1982
H. Atassi Jul. 1982 68 p refs
(Grant AF-AFOSR-0084-81)
(AD-A127043; Rept-1982-10; AFOSR-83-0231TR) Avail: NTIS HC A04/MF A01 CSCL 01/1

This report outlines our research activities for the period of the AFOSR grant. It is not intended to give a detailed description of our work. Such details are described in our publications and cited references. The report, however, defines the scope of our research on the unsteady aerodynamics and the stability analysis of turbomachine components and its relevance to ongoing technological developments in turbomachine design. The mean topic of our research is the unsteady aerodynamics of lifting airfoils subject to three-dimensional gusts. However, the mathematical methods we have developed for this purpose, evolved into a general theory for unsteady vortical and entropic distortions of potential flows. This theory can be also applied within the approximation of the rapid distortion theory of turbulence to study the change in turbulence characteristics near the stagnation point of a bluff body. The mathematical theory was applied to study the aerodynamics of lifting airfoils subject to three-dimensional gusts. For low Mach numbers, an integral equation was derived and a numerical scheme was developed for its solution. All previous gust analyses correspond to particular cases of our present work. We have therefore compared our results with previous linear and nonlinear theories. GRA

N83-31582# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Analysis and Optimization Branch.
WIND TUNNEL EXPERIMENTS ON THE DIVERGENCE OF SWEPT WINGS WITH COMPOSITE STRUCTURES Final Report
Maxwell Blair Oct. 1982 78 p refs
(AF Proj. 2401)
(AD-A127950; AFWAL-TR-82-3018) Avail: NTIS HC A05/MF A01 CSCL 01/3

An elastic wing with variable sweep was designed and subcritically tested for aeroelastic divergence in the Virginia Tech six foot stability wind tunnel. This wing has an internal interchangeable graphite/epoxy plate that provides the wing stiffness. This plate had the shape of a high aspect ratio trapezoid with a line of symmetry coincident with the spanwise reference axis. A fiberglass aerodynamic shell with ten chordwise sections surrounds the plate. These shell sections were mounted so as to minimize their stiffness contribution to the plate and still maintain good aerodynamic performance. A series of six symmetric plates with various fiber orientations were constructed. Fiber layup on each plate is symmetric about the midplane parallel to the surface. By inverting the plate, it was possible to test 11 unique fiber orientations. Theoretically, identified test results predicted relationships between wing sweep, fiber orientation, and divergence speed. One configuration, tested to the divergence speed, showed good correlation with the subcritically projected divergence speed. Author (GRA)

N83-31583# Air Force Geophysics Lab., Hanscom AFB, Mass.
POLYETHYLENE FREE BALLOON DESIGN FROM THE PERSPECTIVES OF USER AND DESIGNER Final Report
James F. Dwyer 12 Nov. 1982 121 p refs
(AF Proj. 7659)
(AD-A127553; AFGL-TR-82-0350; AFGL-IP-314) Avail: NTIS HC A06/MF A01 CSCL 01/3

Those who use large polyethylene balloons for experimental programs are presented with background information on the processes of selecting and designing balloons to meet their respective mission requirements. The effects of payload weight, altitude, duration, and vertical control on both the total payload weight and the balloon size are discussed with respect to these processes. The need to define missions success in terms of realistic requirements is emphasized and a mission planning procedure is proposed. Assumptions and problems in contemporary balloon design are discussed, and design and analysis procedures based on the loads and geometry at the time of launch are developed. Dynamic launch shock is proposed as a criterion for shell thickness, and a model of polyethylene film modulus is developed to account for strain rate and stress and strain relaxation at a launch temperature of 23 degrees C. Computer codes have been written for the processes of balloon selection and balloon design to meet mission requirements. They are intended to be a basis for more efficient, interactive mission planning. Finally, improvements to the balloon design process are proposed and discussed. GRA

N83-31584# Ballistic Research Labs., Aberdeen Proving Ground, Md.
GRID NETWORK GENERATION WITH ADAPTIVE BOUNDARY POINTS FOR PROJECTILES AT TRANSONIC SPEED Final Report
Chen-Chi Hsu Apr. 1983 35 p
(DA Proj. 1L1-61102-AH-43)
(AD-A128041; AD-F300238; ARBRL-TR-02485) Avail: NTIS HC A03/MF A01 CSCL 19/1

The existing grid generation package GRIDGEN for projectile aerodynamics problems has been modified for an additional option to provide grid systems with adaptive boundary grid points. An improvement on hyperbolic grid generation is also made for more accurate finite-difference computations. The modifications made to GRIDGEN have been discussed and documented. The resulting package of computer programs named ADAPTGD has been tested successfully for generating a number of two-dimensional grid networks for a projectile. GRA

N83-31585# Aeronautical Research Labs., Melbourne (Australia).
ESTIMATION PROGRAMS FOR DYNAMIC FLIGHT TEST DATA ANALYSIS
R. A. Feik Jan. 1983 25 p refs
(AD-A128527; ARL/AERO-TM-344) Avail: NTIS HC A02/MF A01 CSCL 01/1

A brief overview of the application of System Identification methodology to the analysis of dynamic flight test data is provided, and the advantages of this approach summarized. Parameter estimation is presented as an important element in the overall process and a number of estimation programs, available on the ARL computer, are described. The advantages and disadvantages of the various procedures, including least squares, maximum likelihood and Kalman filter techniques, are assessed. Suggestions are made on factors to consider in choosing the most suitable method, depending on measurements available, noise levels and model structure. Author (GRA)

N83-32486# Nihon Univ., Tokyo (Japan). Dept. Aeronautical Engineering.

FREQUENCY EFFECT OF TRANSONIC FLOW OVER AN OSCILLATING AIRFOIL
Kiyoaki Ono *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 41-50 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32488# Ochanomizu Women's Univ., Tokyo (Japan). Dept. of Physics.
LIFT GENERATION DUE TO VORTEX SHEDDING
Koichi Oshima and Yuko Oshima *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 65-72 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N83-31586*# Dayton Univ., Ohio. Research Inst.
A COMPUTER SIMULATION OF AIRCRAFT EVACUATION WITH FIRE
Victor E. Middleton Apr. 1983 67 p
(Contract NAS2-11184)
(NASA-CR-166511; NAS 1.26:166511) Avail: NTIS HC A04/MF A01 CSCL 01C

A computer simulation was developed to assess passenger survival during the post-crash evacuation of a transport category aircraft when fire is a major threat. The computer code, FIREVAC, computes individual passenger exit paths and times to exit, taking into account delays and congestion caused by the interaction among the passengers and changing cabin conditions. Simple models for the physiological effects of the toxic cabin atmosphere are included with provision for including more sophisticated models as they become available. Both wide-body and standard-body aircraft may be simulated. Passenger characteristics are assigned stochastically from experimentally derived distributions. Results of simulations of evacuation trials and hypothetical evacuations under fire conditions are presented. Author

N83-31587# Naval Research Lab., Washington, D. C. Combustion and Fuels Branch.
CB AGENT THREAT TO ATMOSPHERE INSIDE NAVY AIRCRAFT Interim Report
R. A. Kamontagne and H. W. Carhart 11 May 1983 11 p refs
(AD-A127882; NRL-MR-5085) Avail: NTIS HC A02/MF A01 CSCL 15/2

The CB agent threat to personnel in closed crew compartments is a serious problem. Research on the decomposition of agents which pass into jet engine compressors and/or heat exchangers has shown that total agent decomposition is not attained. Agent decomposition in jet engine heat exchangers and compressors is a function of agent concentration, temperature, exposure time, surface catalysis and other constituents present in the air.
Author (GRA)

N83-31588# Coast Guard Research and Development Center, Groton, Conn.
AN EVALUATION OF SARP (SEARCH AND RESCUE PLANNING SYSTEM) DRIFT PREDICTIONS USING SATELLITE-TRACKED DRIFT-BUOYS Interim Report, Jan. 1979 - Mar. 1981
D. L. Murphy, L. Nash, D. F. Cundy, and S. R. Osmer Dec. 1982 95 p refs
(AD-A127987; USCG-D-05-83; CGR/DC-24/82) Avail: NTIS HC A05/MF A01 CSCL 06/7

During the period of 1979 through 1981 the USCG Research and Development Center conducted several experiments in which the drift predictions of the computerized Search and Rescue Planning System (SARP) were compared with the movement of satellite-tracked drift-buoys released in the Gulf Stream east of Florida. Buoy positions at specific times were used as the last known position and incident date-time-group of a simulated search and rescue (SAR) incident; subsequent buoy positions were used to test the accuracy of 24, 48, 72, 96, and 120 hour drift predictions. Of the 680 drift predictions evaluated, in only 41 cases (6.0%) was the interpolated buoy position within the SARP-predicted search area. The accuracy of the drift predictions degraded with increasing prediction time; There was no discernible difference between the predicted (forecast) and analysis (observed) wind results; If the effect of wind is not included in the drift prediction the result is a larger relative drift error; The sea current files used in the SARP drift predictions contain some systematic errors which adversely affect system performances; and The drift error factor presently in use seriously underestimates the total drift error. GRA

N83-31589# Simula, Inc., Tempe, Ariz.
DESIGN AND TEST CRITERIA FOR INCREASED ENERGY-ABSORBING SEAT EFFECTIVENESS Final Report, Jun 1979 - Feb. 1983
Joseph W. Coltman Mar. 1983 229 p refs
(Contract DAAK51-79-C-0026; DA Proj. 1L1-62209-AH-76)
(AD-A128015; USAAVRADCOM-TR-82-D-42; NADC-82268-60; TR-82411; FAA-AM-83-3) Avail: NTIS HC A11/MF A01 CSCL 01/2

This report documents a research effort to increase the effectiveness of energy-absorbing seats, through improved design and qualification test criteria. Contained herein are descriptions of a parametric test program and analysis of seat and occupant response sensitivity to design and test variables. Author (GRA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N83-31590*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
FLIGHT DIRECTORS FOR STOL AIRCRAFT Final Report
Uri H. Rabin May 1983 97 p refs
(Contract NCC2-106)
(NASA-CR-166517; NAS 1.26:166517) Avail: NTIS HC A05/MF A01 CSCL 17G

Flight director logic for flight path and airspeed control of a powered-lift STOL aircraft in the approach, transition, and landing configurations are developed. The methods for flight director design are investigated. The first method is based on the Optimal Control Model (OCM) of the pilot. The second method, proposed here, uses a fixed dynamic model of the pilot in a state space formulation similar to that of the OCM, and includes a pilot work-load metric. Several design examples are presented with various aircraft, sensor, and control configurations. These examples show the strong impact of throttle effectiveness on the performance and pilot work-load associated with manual control of powered-lift aircraft during approach. Improved performed and reduced pilot work-load can be achieved by using direct-lift-control to increase throttle effectiveness. Author

N83-31591# Arinc Research Corp., Annapolis, Md.
COST DEVELOPMENT OF THE DUAL-CHANNEL GPS (GLOBAL POSITIONING SYSTEM) NAVIGATOR FOR GENERAL AVIATION APPLICATION Final Report
K. Markin and D. Swann Mar. 1983 75 p refs
(Contract DTFA01-80-C-10030)
(AD-A127157; DOT/FAA/ES-83/1; REPT-1378-51-6-2939) Avail: NTIS HC A04/MF A01 CSCL 05/3

This report presents the methodology used and the results obtained in the avionics cost development of a dual-channel Global Positioning System (GPS) navigation set. The avionics design considered is currently undergoing technical evaluation at MIT Lincoln Laboratory. The cost of the navigation set was developed using an industry-accepted accounting method of cost estimating. GRA

N83-31592# Mitre Corp., McLean, Va.
SOFTWARE DESCRIPTION FOR THE O'HARE RUNWAY CONFIGURATION MANAGEMENT SYSTEM. VOLUME 2: LOW-LEVEL PSEUDOCODE
Sadegh Kavoussi Oct. 1982 443 p refs 2 Vol.
(Contract DTFA01-81-C-10003)
(AD-A127828; FAA-EM-82-28-Vol-2; MTR-82W125-Vol-2) Avail: NTIS HC A19/MF A01 CSCL 17/7

This document describes the software developed as part of the Chicago O'Hare Runway Configuration Management System (CMS). The software is designed as an interactive automated planning aid to assist the O'Hare assistant chief in the consistent selection of efficient runway configurations in order to lower aircraft delays. In addition, CMS serves as an information management system by consolidating various airport data and making them available for the O'Hare facility personnel. Volume 1 of this document contains the general description of the CMS software plus high level pseudocode describing its logic. Volume 2 is dedicated to detailed description of the software via low level pseudocode. Author (GRA)

N83-31593# Sandia Labs., Albuquerque, N. Mex.
WELLBORNE INERTIAL NAVIGATION SYSTEM
James R. Kelsey 1983 23 p refs Presented at the IADC/SPE Drilling Conf., New Orleans, 20 Feb. 1983
(Contract DE-AC04-76DP-00789)
(DE83-004012; SAND-82-1711C; CONF-830203-2) Avail: NTIS HC A02/MF A01

A phototype wireline tool which includes a downhole inertial platform and a surface computer to spatially map a well is described. The hardware consists of a single-gimbaled inertial platform with accelerometers and gyros to obtain three-axis motion information. The gyroscope and accelerometer outputs are transmitted to a computer at the surface which calculates probe attitude relative to north, east, and vertical. Double integration of the accelerometer data provides the position information. A conventional 7-conductor wireline is used for the system data transmission. System accuracy is enhanced by advances made in the computer software which processed the data received from the tool. The software uses statistical sampling estimation to obtain optimal estimates of the system errors. Measurement errors are determined by periodically stopping the tool during the logging procedure and observing the indicated velocity measurements. Author

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-31594 British Aerospace Aircraft Group, Kingston-upon-Thames (England).
AERODYNAMIC EJECTORS IN THE UK
C. L. Bore 15 Oct. 1981 7 p refs
(BAe-KRS-N-GEN-243) Copyright. Avail: Issuing Activity

The applications of ejectors to wind tunnel drives, model engine simulators and reaction control in vertical takeoff and short takeoff aircraft are surveyed. The design of ejector systems for the P1127 Harrier and the use of ejectors to simulate multiple four lift units and jet engines in wind tunnel models are discussed. Theory developments covering conventional mixing ejectors and rotary ejectors are outlined. It is suggested that rotary augmentors could be applied in rear end reaction controls and that they could also be useful as engine power simulators for model aircraft. Author (ESA)

N83-31595*# Douglas Aircraft Co., Inc., Long Beach, Calif.
ADVANCED COMPOSITE VERTICAL STABILIZER FOR DC-10 TRANSPORT AIRCRAFT Quarterly Technical Progress Report, 25 Sep. - 31 Dec. 1978
C. O. Stephens 22 Jan. 1979 200 p refs
(Contract NAS1-14869)
(NASA-CR-172780; NAS 1.26:172780; ACEE-03-PR-9642; QTPR-7) Avail: NTIS HC A09/MF A01 CSCL 01C

Structural design, tooling, fabrication, and test activities are reported for a program to develop an advanced composite vertical stabilizer (CVS) for the DC 10 Commercial Transport Aircraft. Structural design details are described and the status of structural and weight analyses are reported. A structural weight reduction of 21.7% is currently predicted. Test results are discussed for sine wave stiffened shear webs containing representative of the CVS spar webs and for lightning current transfer and tests on a panel representative of the CVS skins. Author

N83-31596*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SERVICE LIFE EVALUATION OF RIGID EXPLOSIVE TRANSFER LINES
Laurence J. Bement, Eleonore G. Kayser (NSWC, Silver Spring, Md.), and Morry L. Schimmel (McDonnell Aircraft Co., St. Louis) Aug. 1983 56 p refs Original contains color illustrations
(NASA-TP-2143; L-15558; NAS 1.60:2143) Avail: NTIS HC A04/MF A01 CSCL 01C

This paper describes a joint Army/NASA-sponsored research program on the service life evaluation of rigid explosive transfer lines. These transfer lines are used to initiate emergency crew escape functions on a wide variety of military and NASA aircraft. The purpose of this program was to determine quantitatively the effects of service, age, and degradation on rigid explosive transfer lines to allow responsible, conservative, service life determination. More than 800 transfer lines were removed from the U.S. Army AH-1G and AH-1S, the U.S. Air Force B-1 and F-111, and the U.S. Navy F-14 aircraft for testing. The results indicated that the lines were not adversely affected by age, service, or a repeat of the thermal qualification tests on full-service lines. Extension of the service life of rigid explosive transfer lines should be considered, since considerable cost savings could be realized with no measurable decrease in system reliability. Author

N83-31597*# Lockheed-Georgia Co., Marietta.
NEW CONSIDERATIONS ON SCALE EXTRAPOLATION OF WING PRESSURE DISTRIBUTIONS AFFECTED BY TRANSONIC SHOCK-INDUCED SEPARATIONS
M. M. S. Kahn and J. F. Cahill Mar. 1983 63 p refs
(Contract NAS2-10855)
(NASA-CR-166426; NAS 1.26:166426; LG83ER0055) Avail: NTIS HC A04/MF A01 CSCL 01C

Use of this analytical parameter, it is shown, highlights the distinction between cases which are dominated by trailing-edge separation, and those for which separation at the shock foot is dominant. Use of the analytical parameter and the distinction noted above greatly improves the correlation of separation data and the extrapolation of wind tunnel data to flight conditions. Author

N83-31598# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
EXPANSION OF THE SCAN ENDGAME PROGRAM FOR AIRCRAFT SURVIVABILITY STUDIES AND DEVELOPMENT OF A SUPPORTING USER'S GUIDE M.S. Thesis
Jean-Paul Fourny Dec. 1982 151 p refs
(AD-A127557) Avail: NTIS HC A08/MF A01 CSCL 09/2

This study involved a detailed examination of the aircraft survivability analysis program called SCAN, and modification of the pre and post-processing graphics programs that support the

program. The aim was the improvement of the originally installed version of SCAN at NPS by incorporating the graphics commands for the new IBM supported terminals, by increasing the speed of the display process, and by simplifying the input data preparation by making it more interactive. In addition, a comprehensive User's Guide was prepared for use by NPS students involved in aircraft survivability/warhead lethality studies. Author (GRA)

N83-31599# Aeronautical Research Labs., Melbourne (Australia).
COMBAT PERFORMANCE EVALUATION OF FIGHTER AIRCRAFT: A SUITE OF FORTRAN-IV PROGRAMS BASED ON ENERGY MANOEUVERABILITY THEORY
G. W. Kipp Mar. 1982 162 p
(AD-A128263; ARL/MECH/ENG-160) Avail: NTIS HC A08/MF A01 CSCL 01/3

A suite of FORTRAN-IV computer programs is described which may be used to assist in evaluating relative combat aircraft performance, using energy maneuverability theory. The programs are described in detail using flowcharts, and full operating instructions are given. A selection of outputs illustrates the graphical and printed capabilities of the suite. GRA

N83-31600# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
COMPUTER PROGRAM ANALYSIS OF HELICOPTER WEIGHT ESTIMATE RELATIONSHIPS UTILIZING PARAMETRIC EQUATIONS M.S. Thesis
Rudolph T. Schwab Jun. 1983 62 p refs
(AD-A128590) Avail: NTIS HC A04/MF A01 CSCL 09/2

This thesis gives the user of an HP-41CV handheld programmable calculator of the IBM 3033 computer, acceptable results of helicopter system wight estimations during the preliminary design phase. The computer program consists of several subroutines and will compute system weight estimates according to Military Standard 1374A. Three categories of military helicopters can be designed; observation, utility, and cargo. Detailed knowledge of helicopters is not required. Author (GRA)

N83-31601# Army Aviation Engineering Flight Activity, Edwards AFB, Calif. Directorate for Development and Qualification.
FUEL CONSERVATION EVALUATION OF US ARMY HELICOPTERS. PART 5: AH-1S SLIGHT TESTING Final Report, 31 Jul. - 21 Sep. 1982
Loren L. Todd, Richard T. Savage, Richard L. Vincent, Robert A. Williams, Gary T. Downs, and Michael K. Herbst Jan. 1983 74 p refs
(AD-A128532; USAAEFA-81-01-5) Avail: NTIS HC A04/MF A01 CSCL 01/3

The United States Army Aviation Engineering Flight Activity conducted level flight performance tests of the AH-1S (Prod) helicopter to provide data to determine the most fuel efficient operating conditions. Hot and cold weather test sites were used to extend the range of the advancing tip Mach number data to supplement existing AH-1S performance data. Preliminary analysis of non-dimensional data identifies the effects of compressibility on performance and shows a power penalty of as much as 6% at a high NR/theta. The power required characteristics determined by these tests can be combined with engine performance to determine the most fuel efficient operating conditions. GRA

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N83-31602*# Honeywell, Inc., Minneapolis, Minn. Avionics Div.
DEMONSTRATION ADVANCED AVIONICS SYSTEM (DAAS), PHASE 1 Final Contractor Report
A. J. Bailey, D. G. Bailey, R. J. Gaabo, T. G. Lahn, J. C. Larson, E. M. Peterson, J. W. Schuck, D. L. Rodgers (King Radio Corp., Olathe, Kansas), and K. A. Wroblewski (King Radio Corp., Olathe, Kansas) Apr. 1981 161 p
(Contract NAS2-10021)
(NASA-CR-166503; NAS 1.26:166503) Avail: NTIS HC A08/MF A01 CSCL 01D

Demonstration advanced anionics system (DAAS) function description, hardware description, operational evaluation, and failure mode and effects analysis (FMEA) are provided. Projected advanced avionics system (PAAS) description, reliability analysis, cost analysis, maintainability analysis, and modularity analysis are discussed. Author

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-31603* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CONTROL MEANS FOR A GAS TURBINE ENGINE Patent
Richard S. Beitler (General Electric Co., Cincinnati), Frederick J. Sellers (General Electric Co., Cincinnati), and George W. Bennett, inventors (to NASA) (General Electric Co., Cincinnati) Issued 6 Jul. 1983 10 p Filed 26 Jun. 1980
(NASA-Case-LEW-14586-1; US-Patent-4,338,061; US-Patent-Appl-SN-163122; US-Patent-Class-415-1; US-Patent-Class-415-47; US-Patent-Class-415-175; US-Patent-Class-415-178) Avail: US Patent and Trademark Office CSCL 21E

A means is provided for developing a signal representative of the actual compressor casing temperature, a second signal representative of compressor inlet gas temperature, and a third signal representative of compressor speed. Another means is provided for receiving the gas temperature and compressor speed signals and developing a schedule output signal which is a representative of a reference casing temperature at which a predetermined compressor blade stabilized clearance is provided. A means is also provided for comparing the actual compressor casing temperature signal and the reference casing temperature signal and developing a clearance control system representative of the difference. The clearance control signal is coupled to a control valve which controls a flow of air to the compressor casing to control the clearance between the compressor blades and the compressor casing. The clearance control signal can be modified to accommodate transient characteristics. Other embodiments are disclosed.

Official Gazette of the U.S. Patent and Trademark Office

N83-31604# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
ENGINE PERFORMANCE COMPARISON ASSOCIATED WITH CARBURETOR ICING DURING AVIATION GRADE FUEL AND AUTOMOTIVE GRADE FUEL OPERATION Final Report, Jan. - Jul. 1982
William Cavage, James Newcomb, and Keith Biehl May 1983 114 p refs Original contains color illustrations
(FAA Proj. 184-320-120)
(DOT/FAA/CT-82/110) Avail: NTIS HC A06/MF A01

Sea-level-static test cell engine operations were conducted utilizing a Teledyne continental Motors 0-200A engine and a Cessna 150 fuel system to review engine operational characteristics on 100LL aviation grade fuel and various blends of automotive grade fuel as well as carburetor ice detectors/warning devices sensitivity/effectiveness during actual carburetor icing. The primary purpose of test cell engine operation was to observe real-time carburetor icing characteristics associated with possible automotive grade fuel

utilization by piston-powered light general aviation aircraft. In fulfillment of this task, baseline engine operations were established with 100LL aviation grade fuel followed by various blend of automotive grade fuel prior to imposing carburetor icing conditions and assessing operational characteristics. Author

N83-31605# Ecole Polytechnique Federale de Lausanne (Switzerland). Lab. de Thermique Appliquee.
AEROELASTICITY IN TURBOMACHINE-CASCADES Semiannual Progress Report, 1 Mar. - 31 Aug. 1982
Peter Suter and Torsten H. Fransson 10 Nov. 1982 45 p refs (Grant AF-AFOSR-0251-81; AF Proj. 2307)
(AD-A127709; AFOSR-83-0354TR; EPFL/LTA-TM-8-82; SAPR-2) Avail: NTIS HC A03/MF A01 CSCL 21/5

A standardization nomenclature and reporting format, to be used for reporting format allows for both detailed comparison of the experimental and theoretical results, as well as for a direct judgment of the flutter tendencies of a specific turbomachine blading. A large number of (36) unsteady experimental data have been compiled, classified and evaluated. Out of these 36 data, 9 have been retained as possible test cases. Also the manifested by the fact that already 25 researchers (from the academic and industrial worlds) have announced their intentions to predict the aeroelastic behavior of one or several of the experimental test cases. An absence of well documented experimental data have been found, noticeable in the domain of high turning subsonic turbine blades and in the field of transonic/supersonic quasi-two-dimensional flat plate investigations. As regards to the high turning turbine blades, the Laboratoire de Thermique Appliquee has recently started such experimental work. GRA

N83-31606# Dayton Univ., Ohio. Group for Impact Physics.
STRUCTURAL ELEMENT AND REAL BLADE IMPACT TESTING, VOLUME 1 Final Report, Oct. 1977 - Jun. 1980
Robert S. Bertke Wright-Patterson AFB, Ohio AFWAL Jan. 1983 469 p refs 2 Vol.
(Contract F33615-77-C-5221; AF Proj. 3066)
(AD-A127744; AFWAL-TR-82-2121-Vol-1; UDR-TR-82-03-Vol-1) Avail: NTIS HC A20/MF A01 CSCL 14/2

This report gives damage results of an experimental program concerned with performing nonrotating bench impact tests on test specimens ranging from simple cantilevered beams and plates to real fan blades. This study was carried out under Task VI Structural Element Tests which is part of the overall program Foreign Object Impact Damage Criteria. In the study, simple element specimens, such as beams and plates, were impact tested with progressive introduction of airfoil geometric parameters to validate experimentally the analytical predictions of Tasks V and VIII of the overall program. Impact tests were also conducted on actual fan blades to permit deriving correlation of the impact damage between the structural element specimens and full-scale blades. Data collected from the impact tests included accurate impact conditions, dynamic displacement of specimens at discreet points, strain/time histories local to the impact site and at critical blade stress regions identified from the structural response models, pre-test and post-test material properties, and damage assessment. GRA

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N83-31607# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DESIGN OF A MULTIVARIABLE TRACKER CONTROL LAW FOR THE A-7D DIGITAC 2 AIRCRAFT M.S. Thesis
Randall N. Paschall Dec. 1981 183 p refs
(AD-A127440; AFIT/GE/EE/81D-47) Avail: NTIS HC A09/MF A01 CSCL 01/3

This thesis uses the design procedures developed in an attempt to design a multivariable tracker control law for the A-7D Digitac II Aircraft. Some of the limitations and problems associated with this design procedure are uncovered in this study. A six degree-of-freedom aircraft model is developed and is then modified to a form that is required by the design procedure. The theory used for the design determines the necessary arrangement of the equations. A tracker control law is first designed for one flight condition. Then it is checked for robustness by applying the control law at a different flight condition and also by removing the rudder from the inputs. A design computer program called MULTI is developed to perform the computations and simulations. It is found that the design techniques are valid, but that they are not applicable to all systems. A problem occurs when the inputs, as with an aircraft, are bounded. Problems may also be encountered when the sensor and actuator models are incorporated into the design. Therefore, for this study, the sensor and actuator models are removed and approximated as unity. GRA

N83-31608# National Aeronautical Establishment, Ottawa (Ontario). Flight Simulator Lab.
DEVELOPMENT OF THE MICROSAS LONGITUDINAL FLIGHT CONTROL SYSTEM FOR THE AUGMENTOR WING AIRCRAFT
S. Kereliuk, K. Lum, and W. E. B. Roderick Feb. 1983 38 p refs In ENGLISH; FRENCH summary
(AD-A128331; NRC-21066; NAE-AN-5) Avail: NTIS HC A03/MF A01 CSCL 01/3

A digital longitudinal stability augmentation system was designed and installed in the Augmentor Wing Research Aircraft by the Flight Research Laboratory of the National Aeronautical Establishment. This system partially replaced the computer-controlled control and display system called STOLAND owned by NASA Ames Research Center that was removed from the aircraft prior to its return to Canada. The computer system is described and the software flow charts are illustrated. Brief comments on the performance of the system during the flight test program are included. GRA

N83-31609# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
A LATERAL-DIRECTIONAL CONTROLLER FOR HIGH-ANGLE-OF-ATTACK FLIGHT M.S. Thesis - Princeton Univ.
William A. Ehrenstrom Mar. 1983 199 p refs
(AD-A128579; AFIT-CI-NR-83-12T) Avail: NTIS HC A09/MF A01 CSCL 01/2

A digital flight control system based on microprocessor technology has been designed, developed, and flight tested using the Avionics Research Aircraft (ARA). The control system utilizes the existing microprocessor system available in the aircraft's fly-by-wire control system. The command and stability augmentation control law was developed using modern control theory and is incorporated into existing flight control computer programs. Development of the model and control law, the gain scheduling procedure, and the flight test results are presented. The objctive of the study was to provide lateral-directional stability during high-angle-of-attack flight and into the stall regime. Flight test results show that it is indeed possile to design a control system which will eliminate lateral-directional instabilities and do so at a level higher than the pilot was able to attain. GRA

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N83-31610 Oxford Univ. (England). Dept. of Engineering Science.
THE TOPSY GUIDE. TRANSIENT TUNNEL OPERATING, DATA ACQUISITION AND PROCESSING SYSTEM. USER'S AND

PROGRAMMER'S GUIDES
N. C. Baines Apr. 1983 60 p refs
(OUEL-1462/83) Copyright. Avail: Issuing Activity

TOPSY, a microcomputer operating system for controlling short duration experiments in fluid dynamics is described. TOPSY is not specific to one wind tunnel or one experimental arrangement. The entire system is menu driven for easy use. A modular system divided into separate subroutines and separate programs assures simplicity of modification. TOPSY was implemented on a PDP 11 computer. Author (ESA)

N83-31611# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).
DEVELOPMENT OF A CRYOGENIC WINDTUNNEL BALANCE
E. Graewe 1982 25 p refs Presented at ETW Cryog. Technol. Rev. Meeting, Amsterdam, 15-17 Sep. 1982 Sponsored by German Ministry of Research and Technology
(KB-TE-1-1173) Avail: NTIS HC A02/MF A01

The behavior of bending beams from maraging steel equipped with strain gage bridges in the cryo-temperature-range is considered. Development of an unheated six component balance for the use in a cryogenic wind tunnel is considered. Author

N83-31612*# Fluidyne Engineering Corp., Minneapolis, Minn.
PRELIMINARY ENGINEERING STUDY: QUICK OPENING VALVE MSFC HIGH REYNOLDS NUMBER WIND TUNNEL Final Report
Jul. 1983 50 p refs
(Contract NAS8-35056)
(NASA-CR-170845; NAS 1.26:170845) Avail: NTIS HC A04/MF A01 CSCL 14B

FluiDyne Engineering Corporation has conducted a preliminary engineering study of a quick-opening valve for the MSFC High Reynolds Number Wind Tunnel under NASA Contract NAS8-35056. The subject valve is intended to replace the Mylar diaphragm system as the flow initiation device for the tunnel. Only valves capable of opening within 0.05 sec. and providing a minimum of 11.4 square feet of flow area were considered. Also, the study focused on valves which combined the quick-opening and tight shutoff features in a single unit. A ring sleeve valve concept was chosen for refinement and pricing. Sealing for tight shutoff, ring sleeve closure release and sleeve actuation were considered. The resulting cost estimate includes the valve and requisite modifications to the facility to accommodate the valve as well as the associated design and development work. Author

N83-31613# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Civil Engineering.
OPTIMIZATION OF LONG RANGE MAJOR REHABILITATION OF AIRFIELD PAVEMENTS Ph.D. Thesis
David Henry Artman, Jr. Jan. 1983 156 p refs
(AD-A127579; AFIT-CI-NR-83-7D) Avail: NTIS HC A08/MF A01 CSCL 01/5

The goal of this research has been to develop a methodology for managing pavement networks over prolonged analysis periods. Separate independent methods were devised for project and network level analysis, and the project level procedures were designed to provide inputs into the network level procedures. For the project level analysis, a computer code was written to use dynamic programming methods to optimally select schedule the activities (routine maintenance, reconstruction, and overlays) over the analysis period (20 years), by maximizing the structural performance (area under the utility weighted Pavement Condition Index (PCI) versus time curve). At the network level, the mathematical representation of choosing those projects that maximize the sum of the user value weighted structural performance of each project, is a zero-one integer linear programming model. Projects are selected using Toyoda's heuristic (each related to a specific feature) that maximizes the objective function with pre-established constraints (network funding limit, etc.). At several funding levels, and a series of management information reports are generated. With these reports, the consequences of selected network funding levels can quantitatively be compared. In addition, an estimate of an appropriate level of funding for the entire system can be made. The simple example shows a substantial difference between a manually developed network program and a program developed with the procedures developed in this research and an application to an existing Air Force base was presented. Author (GRA)

N83-31614# Georgia Inst. of Tech., Atlanta. School of Civil Engineering.
EVALUATION OF DESIGN CRITERION OF THE STRATEGIC EXPEDITIONARY LANDING FIELD M.S. Thesis
Richard Everett Burgoyne Dec. 1982 104 p refs
(Contract N66314-70-A-0067)
(AD-A128323) Avail: NTIS HC A06/MF A01 CSCL 14/2

This study concerns the relaxation of design criterion for the strategic expeditionary landing field. The design criterion are individually evaluated to determine underlying or governing principles. Each principle is then reviewed to determine the implied or hidden factors of safety. Criteria are then reviewed individually to determine the effects of relaxing that criterion. The evaluation is made to ensure the operational ability of the facility and the construction effort. The construction effort is evaluated for a given circumstance before and after the proposed criterion change. The scope of this work is only that of construction effects and construction effort. The effects on aircraft are not evaluated other than to ensure that the aircraft's performance abilities have not been exceeded. GRA

N83-31615# Veda, Inc., Arlington, Va.
COMPUTER AIDED SYSTEM FOR DEVELOPING AIRCREW TRAINING (CASDAT) Final Report, Sep. 1978 - 15 Jul. 1982
N. C. Marcue, Arthur S. Blaiwes, and Robert G. Bird Orlando, Fla. Naval Training Equipment Center Mar. 1983 208 p refs
(Contract N61339-80-D-0009)
(AD-A128530; NAVTRAEQUIPC-79-C-0076-1; VEDA-113425-82U/P0707) Avail: NTIS HC A10/MF A01 CSCL 05/9

The Naval Training Equipment Center (NAVTRAEQUIPCEN) initiated a research program to investigate automation and other aids as tools to reduce time and personnel requirements of instructional systems development (ISD). This study was conducted in three phases. (1) Determine the theoretical feasibility of using automation to reduce the cost of ISD. (2) Demonstrate feasibility by building a prototype aid to ISD. (3) Develop the prototype CASDAT into a useful operational system. GRA

N83-31616# General Accounting Office, Washington, D. C. Resources Community Economic Div.
POTENTIAL JOINT CIVIL AND MILITARY USE OF MILITARY AIRFIELDS
1 Mar. 1983 43 p
(PB83-186734; GAO/RCED-83-98; B-210769) Avail: NTIS HC A03/MF A01 CSCL 01E

GAO's evaluation of joint civilian and military use of military airfields shows the concept to be feasible. Currently, 23 military airfields are operating under joint use agreements. Whether joint use can be expanded to other military airfields depends on overcoming problems unique to each airfield and on the full cooperation of the military and civilian parties involved. Some of the problems are: (1) military concerns about impacts on mission, operations, and/or security; (2) lack of available land to house civilian operations; and (3) lack of support by a civilian sponsor resulting from community opposition or the lack of a real need for joint use of the airfield. GRA

N83-31653# Erno Raumfahrttechnik G.m.b.H., Bremen (West Germany).
DEVELOPMENT OF ADVANCED HEATING FACILITY CONCEPTS FOR MICROGRAVITY APPLICATION
J. Schawer *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 105-108 (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31658# Centre National de la Recherche Scientifique, Grenoble (France).
MINIZONE IMAGE FURNACE
R. PerrierdelaBathie, J. Gosset (CNES, Toulouse), J. C. Hennequin (CNES, Toulouse), and F. Jamin-Changeart (CNES, Toulouse) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 133-134 (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31659# Centre National d'Etudes Spatiales, Toulouse (France).
ISOTHERMAL GRADIENT HEAT-PIPES SPACE FURNACE (500 TO 1000 DEG C)
G. Cambon and F. Jamin-Changeart *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 135-136 (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N83-31617# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE, NO. 23
28 Jul. 1983 105 p Transl. into ENGLISH from various Russian articles
(JPRS-83994) Avail: NTIS HC A06
This serial report contains news items, abstracts and articles of scientific reports on all aspects of space including manned mission highlights, space sciences, interplanetary sciences, life sciences, space engineering, space applications, space policy and administration, and a launch table. For individual titles, see N83-31618 through N83-31631.

N83-31618# Joint Publications Research Service, Arlington, Va.
ZAYTSEV COMMENTS ON MODULAR ORBITAL STATIONS **c15**
Yu. Zaytsev *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 1 Transl. into ENGLISH from Sov. Estoniya (Tallinn), 12 Apr. 1983 p 4 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06
The use of large space stations verses small modular laboratories is discussed. The advantages and disadvantage of the modular laboratories are examined. B.G.

N83-31619# Joint Publications Research Service, Arlington, Va.
COMMENTARY ON SOYUZ T-8 RENDEZVOUS FAILURE
M. Rebrov *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 2-3 Transl. into ENGLISH from Krasnaya Zvezda (Moscow), 23 Apr. 1983 p 3 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06
The failure of the Soyuz T-8 to dock with the Salyut Space Station is discussed. A discussion of the rendezvous trajectories and the crew safety was presented. B.G.

N83-31620# Joint Publications Research Service, Arlington, Va.
SALYUT-7 PASSES ONE YEAR IN ORBIT MARK
V. Blagov *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 4-6 Transl. into ENGLISH from Krasnaya Zvezda (Moscow), 19 Apr. 1983 p 3 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06
The highlights of the first year of the Salyut Space Station were presented. Areas discussed were long duration space flight, manufacture of semiconductor materials, medical and biological studies, spaceborne photography, the crews, and the control center. B.G.

N83-31621# Joint Publications Research Service, Arlington, Va.
RYUMIN INTERVIEWED ON SALYUT EXPERIMENTS
V. Petrenko *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 7-9 Transl. into ENGLISH from Pravda Ukr. (Kiev), 24 Feb. 1983 p 3 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06
The various spaceborne experiments conducted on the long duration space flights were discussed. Response of the cosmonauts to their duties was examined. B.G.

N83-31622# Joint Publications Research Service, Arlington, Va.
STAR CITY ASTRONAUT TRAINING CENTER **c14**
Ernest Anisimovich Vaskevich *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 20-29 Transl. into ENGLISH from the book "Zvezdny Gorodok (Novoye v Zhizni, Nauke, Tekhnike: Ser. Kosmonavtika" Moscow, Izd. Znaniye, no. 8, Aug. 1981 p 27-37 and 46-52 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06
Astronaut training consists of two phases: general space training and flight training. Flight simulation is conducted with the use of special facilities: human centrifuges, hydrolaboratories, pressure chambers, and fly laboratories to simulate weightlessness. Medico-biological and physical training are conducted to prepare for flight. Flight training promotes skills in monitoring instruments to perform under varied conditions. All forms of training complement each other and are aimed at comprehensive and qualitative preparation for complex, crucial, and at times dangerous missions. B.G.

N83-31623# Joint Publications Research Service, Arlington, Va.
COSMONAUT TRAINING SIMULATORS AT ZVEZDNYY GORODOK DESCRIBED **c14**
A. Pokrovskiy *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 30-32 Transl. into ENGLISH from Pravda (Moscow), 12 Apr. 1983 p 3 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06
The training center at Zvezdnyy is described. It is an international center for training Soviet and foreign cosmonauts. High assessment is given to the technical equipment, knowledge and teaching skills of its instructors. A three in one task is faced-that of training cosmonauts, equipping the center with modern equipment and training instructors. B.G.

N83-31624# Joint Publications Research Service, Arlington, Va.
COMMENTARY ON ASTRON SATELLITE **c15**
V. Gubarev *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 34-36 Transl. into ENGLISH from Pravda (Moscow), 24 Mar. 1983 p 6 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06
The structural design of the Astron satellite is discussed. Effects of vibration, temperature, vacuum, orbit perturbation, and data processing are examined. B.G.

N83-31625# Joint Publications Research Service, Arlington, Va.
DISCUSSION OF HALLEY'S COMET PROJECTS **c91**
V. Petrenko *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 37-39 Transl. into ENGLISH from Pravda Ukr. (Kiev), 7 Apr. 1983 p 4 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06
Satellite observation of Halley's Comet by the Venera satellite, Giotto mission, and Planet A is discussed. Probing the center of the comets will help scientists to check ideas and hypotheses about the physics and chemistry of comets and their origin. Since comets are relict aggregates of substances from the same solar nebula that served as building material for our solar system, scientists are hoping for information on the origin of life of the Earth and the universe. B.G.

N83-31626# Joint Publications Research Service, Arlington, Va.
FLIGHT CONTROL CENTER'S HISTORY, FUNCTIONS SPOTLIGHTED **c14**

M. Rebrov *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 40-44 Transl. into ENGLISH from Krasnaya Zvezda (Moscow), 25 Mar. 1983 p 4 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

Dependable operation of the Earth-space-Earth radio bridge is discussed. Flight control is a broad concept: monitoring the state and operation of onboard systems, evaluation of flight program, decision making, malfunction, and crew relationship. All of this necessitates good communications. Computer graphics display results in real time operations. Regular collection of information allows improved performance in communicator. B.G.

N83-31627# Joint Publications Research Service, Arlington, Va.
INTERACTION OF SOLAR WIND WITH MAGNETOSPHERE OF VENUS c91
T. Breus and K. Gringauz *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 55-57 Transl. into ENGLISH from Pravda (Moscow), 10 Jan. 1983 p 7 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

Nonuniformity in the structure of the solar corona and the transience of its processes determine a nonuniformity and fleetingness in the properties of solar wind, the medium in which the planets exist. The velocity and concentration of interplanetary plasma and the size and direction of the interplanetary magnetic field may therefore vary substantially. The density of solar wind is very low and its magnetic field quite weak. How then do the planets react to such an ephemeral phenomenon? It turns out that the interaction of atmospheres, ionospheres and the magnetic fields of the individual planets with solar wind and the interplanetary magnetic field comprise a special area of planetary physics which is quite significant. The initial discoveries in this sphere were made, naturally, with respect to the Earth. The Earth as a strong magnetic field. It was established that solar wind meets this obstacle as it nears our planet and skirts around it. As a result, the solar wind seemingly draws lines of force of the Earth's magnetic field out away from the Sun, creating a so-called magnetospheric tail hundreds of thousands of kilometers in length and about 200, 000 km in cross section. Author

N83-31628# Joint Publications Research Service, Arlington, Va.
COMMENTARIES ON SUCCESSFUL PLANT GROWING EXPERIMENTS ON SALYUT-7
D. Shnyukas *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 62-64 Transl. into ENGLISH from Pravda (Moscow), 31 Dec. 1982 p 3 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

The gravitational physiology of plants was investigated. The grass arabidopsis, grown under weightless conditions, completed an entire biological cycle-seed to seed. The system used for growth was improved. The planted area was enlarged, a new water supply introduced and aeration of the root zone. The plants were subjected to electrical stimulation, and mineral nourishment conditions were improved. The seeds produced were brought back to Earth and germinated. B.G.

N83-31629# Joint Publications Research Service, Arlington, Va.
RENDEZVOUS IN SPACE
O. Georgiyev *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 67-72 Transl. into ENGLISH from Aviatsiya i Kosmonavtika (Moscow), no. 2, Feb. 1983 p 40-41 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

Among the problems of maneuvering in orbit one of the most interesting is that of a rendezvous between two space vehicles. In its resolution, one of the space vehicles usually plays an active role while the other remains passive. A typical example of this kind of distribution of roles is provided by the transport "Soyuz" or "Progress" freighter (the active space vehicle) moving to rendezvous with the "Salyut" station (the passive space vehicle). The station already in flight must burn its engine in a predetermined way to alter or correct its own movement so that at the moment of separation the orbital parameters of the station and its position in this orbit will satisfy certain predetermined conditions. The problem of injecting the vehicle into the plane of the assembly orbit is resolved (otherwise during rendezvous energy-consuming maneuvers will be required to match the orbital planes of the rendezvousing space vehicles). In addition, during the injection phase a predetermined range of distances is set up between the passive and active vehicles at the moment when the latter is injected into orbit. Author

N83-31630# Joint Publications Research Service, Arlington, Va.
SPACE SURVEY TECHNIQUES BENEFIT GEOLOGY c46
Geology V. Volkov *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 75-77 Transl. into ENGLISH from Izvestiya (Moscow), 15 Jan. 1983 p 3 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

Projects for the discovery of new deposits of useful minerals that are conducted on the basis of the extensive utilization of photographs from space consist of a number of sequential stages. Initially, comparatively small-scale, specialized cosmogeological and mineragenetic-prediction maps are compiled from space photographs. Elements of the structure of the Earth's crust to which increased concentrations of useful minerals can be confined are isolated on them. During the second stage, onsite confirmation of the results of interpreting the space photographs is carried out. The projects are completed by purposeful prospecting for deposits. Cosmogeological cartography is now being done on a systematic basis and encompasses this country's entire territory. Specialized maps with images of large structural elements discovered with the help of space surveying materials were compiled for the first time in world practice. Author

N83-31631# Joint Publications Research Service, Arlington, Va.
JURIST COMMENTS ON LEGAL QUESTIONS REGARDING US SHUTTLE c16
A. Rudev *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 93-97 Transl. into ENGLISH from Aviatsiya i Kosmonavtika (Moscow), no. 3, Mar. 1983 p 36-37 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

The Soviet draft Treaty on Banning the Placement of Any Kind of Weapons in Outer Space, submitted in August 1981 to the 36th session of the UN General Assembly, contains a number of provisions directly concerning the space shuttle. For example, Article 1 of this document prohibits participating states from placing objects with weapons of any kind into orbit around the Earth, setting up such weapons on celestial bodies or locating them in outer space by any other means, including on manned, reusable spacecraft both of existing types and others which might appear in the future. Article 2 of the draft envisages that participating states will use space objects in strict conformity with international law, including the UN Charter, in the interest of maintaining international peace and security and developing international cooperation and mutual understanding. Author

N83-31632*# Vought Corp., Dallas, Tex.
DEVELOPMENT OF DEPLOYABLE STRUCTURES FOR LARGE SPACE PLATFORM SYSTEMS. VOLUME 1: EXECUTIVE SUMMARY
R. L. Cox and R. A. Nelson 9 May 1983 24 p
(Contract NAS8-34678)
(NASA-CR-170838; NAS 1.26:170838;
Rept-2-32300/3R-53434-Vol-1) Avail: NTIS HC A02/MF A01 CSCL 22A

Candidate deployable linear platform system concepts suitable for development to technology readiness by 1986 are reviewed. The systems concepts were based on trades of alternate deployable/retractable structure concepts, integration of utilities, and interface approaches for docking and assembly of payloads and subsystems. The deployable volume studies involved generation of concepts for deployable volumes which could be used as unpressurized or pressurized hangars, habitats and interconnecting

tunnels. Concept generation emphasized using flexible materials and deployable truss structure technology. Author

N83-31633# Committee on Foreign Affairs (U. S. House).
OVERSIGHT OF THE UNISPACE CONFERENCE
Washington GPO 1983 42 p Hearing before the Subcomm. on Intern. Operations of the Comm. on Foreign Affairs, 97th Congr., 2d Sess., 28 Jul. 1982
(GPO-14-255) Avail: Subcommittee on International Operations
Hearings on the preparation of the U.S. delegation to the second U.N. Conference on the Peaceful User of Outer Space, UNISPACE 1982 are presented. Author

N83-31634*# TRW Space Technology Labs., Redondo Beach, Calif. Space and Technology Group.
DEFINITION OF SATELLITE SERVICING TECHNOLOGY DEVELOPMENT MISSIONS FOR EARLY SPACE STATIONS. VOLUME 2: TECHNICAL Final Report
31 May 1983 363 p
(Contract NAS8-35081)
(NASA-CR-170844; NAS 1.26:170844) Avail: NTIS HC A16/MF A01 CSCL 22A
Early space station accommodation, build-up of space station manipulator capability, on-orbit spacecraft assembly test and launch, large antenna structure deployment, service/refurbish satellite, and servicing of free-flying materials processing platform are discussed. Author

N83-31635*# TRW Space Technology Labs., Los Angeles, Calif.
DEFINITION OF SATELLITE SERVICING TECHNOLOGY DEVELOPMENT MISSIONS FOR EARLY SPACE STATIONS
31 May 1983 46 p
(Contract NAS8-35081)
(NASA-CR-170843; NAS 1.26:170843; DR-4) Avail: NTIS HC A03/MF A01 CSCL 22A
Mission requirements, mission definition of selected satellite servicing technology development missions, and programmatic analysis of the selected missions are addressed. Author

N83-31636*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRESSURE DISTRIBUTIONS OBTAINED ON A 0.04-SCALE AND 0.02-SCALE MODEL OF THE SPACE SHUTTLE ORBITER'S FORWARD FUSELAGE IN THE LANGLEY 20-INCH MACH 6 AIR TUNNEL
Pamela F. Bradley, Paul M. Siemers, III, Paul F. Flanagan, and Martin W. Henry Mar. 1983 44 p refs
(NASA-TM-84629; NAS 1.15:84629) Avail: NTIS HC A03/MF A01 CSCL 01A
Results from pressure distribution tests on 0.04-scale and 0.02-scale models of the forward fuselage of the Space Shuttle Orbier are presented without analysis. The tests were completed in the Langley 20-Inch Mach 6 Tunnel. The 0.04-scale model was tested at angles of attack from 0 to 35 and angles of sideslip from 0 to -4. The 0.02-scale model was tested at angles of attack from -10 to 45 and angles of sideslip from 0 to -4. The tests were conducted in support of the development of the Shuttle Entry Air Data System (SEADS). In addition to modeling the 20 SEADS pressure orifices, the wind-tunnel to models were also instrumented with orifices to match Development Flight Instrumentation (DFI) port locations currently existing on the Space Shuttle Orbiter Columbia (OV-102). This DFI simulation had provided a means for comparisons between reentry flight pressure data and wind-tunnel data. Author

N83-31637# European Space Agency, Paris (France).
MATERIALS SCIENCES UNDER MICROGRAVITY
T. D. Guyenne, ed. and J. Hunt, ed. Jun. 1983 448 p refs Proc. of 4th European Symp. on Mater. Sci. under Microgravity, Madrid, 5-8 Apr. 1983; sponsored by ESA, Universidad Politecnica de Madrid, ELGRA and COSPAR
(ESA-SP-191) Avail: NTIS HC A19/MF A01; ESA, Paris FF 140
The ESA, NASA, Soviet and other microgravity research programs; composites and heterogeneous phases; experimental facilities; transport phenomena; combustion; gas-liquid interfaces; liquid-solid interfaces; and critical point phenomena were discussed. For individual titles, see N83-31638 through N83-31703.

N83-31638# Polytechnical Univ. of Madrid (Spain). Lab. of Aerodynamics.
FLUID PHYSICS UNDER REDUCED GRAVITY: AN OVERVIEW **c34**
I. Da-Riva and L. G. Napolitano (Naples Univ.) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 5-12 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140
Fluid physics experiments to be performed under reduced gravity, onboard Spacelab, and parallel and preparatory work on Earth are discussed. Investigations of oscillation damping of a liquid in natural levitation; kinetics of spreading of liquids on solids; and free convection in low gravity are summarized. Capillary surfaces in low gravity, coupled motion of liquid-solid systems in near zero gravity; floating zone stability in low gravity; and interfacial instability and capillary hysteresis experiments are outlined. Author (ESA)

N83-31639# Commissariat a l'Energie Atomique, Grenoble (France).
NEW FEATURES OF THE EUROPEAN MICROGRAVITY PROGRAMS
Y. Malmejac and P. R. Sahm (Giesserei Inst., Aachen) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 13-22 (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140
The evolution of microgravity research is traced. Results include the establishment of the antagonistic roles of solutal convection and thermal convection. The mean level of gravity required for a given experiment can be determined, as can the influence of a change in microgravity. The existence of two types of striations is demonstrable. The segragating role of wetting behavior in nonmiscible alloys is clarified. In microgravity, the critical velocity for particle engulfment can be lowered so drastically that an even distribution of ceramic particles in a metal matrix can be obtained without recourse to powder metallurgy technology. Author (ESA)

N83-31640# Tokyo Inst. of Tech. (Japan).
JAPANESE PROGRAM REVIEW OF MATERIAL PROCESSING IN SPACE
A. Sawaoka *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 23-27 (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140
Ground based simulations of material processing in space, the specifications of the TT 500A rocket for material processing experiments, Japanese participation in the Spacelab program, and research into the creation of materials in microgravity are outlined. The TT 500A electric furnaces can heat a 35 mm x 10 mm sample to 1500 C within 2 min and cool it from 1500 to 800 C in 2 min, with + or - 50 C accuracy. Author (ESA)

N83-31641# Katholieke Universiteit te Leuven (Belgium). Dept. Metaalkunde.
METALLIC COMPOSITE MATERIALS AND MICROGRAVITY **c24**
L. Froyen and A. Deruyttere *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 31-36 refs Sponsored by Nationaal Fonds voor Wetenschappelijk Onderzoek (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140
The wetting behavior of Al-SiC and Cu-SiC was investigated. The TEXUS and Spacelab investigations of interfacial phenomena are outlined. Large SiC particles are exuded from a copper matrix during the melting of the compacted sample as a consequence of the interfacial reaction between Cu and SiC, independent of gravity conditions; the exudation of finer particles is limited, but the SiC is also partically decomposed. The particulate composite Al-SiC is promising due to the relatively good bonding between

the matrix and the carbide; no brittle interfacial layer is formed. The sample and crucible design for TEXUS 7 facilitates the interpretation of the rearrangement mechanisms of the particles during melting and solidification. Author (ESA)

N83-31642# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Space Simulation.

PARTICLE TRANSPORT INDUCED BY DIRECTIONAL SOLIDIFICATION **c76**

H. Klein and R. Naehle *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 37-40 refs (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The scientific objectives and technical implementation of an STS 7 experiment which studies particle transport mechanisms in multiphase dispersions using a transparent model system for optical observation are presented. The motion of air bubbles and liquid Pb particles in molten Cs Cl during directional solidification is photographed. The particle diameter dependence of the interface tension gradient driven velocity of the gaseous and liquid particles is measured. The particle diameter dependence of the critical velocity of the solidification front which separates the regimes of particle rejection by the interface, and particle trapping in the solid, is studied. Author (ESA)

N83-31643# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Space Stimulation.

THERMOCAPILLARY MIGRATION OF BUBBLES IN LIQUIDS SHOWING RELAXATION OF SURFACE TENSION **c34**

A. Bewersdorff *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 41-44 refs (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Young's formula for bubble motion is extended to the case where surface tension is time dependent. As a new surface is created continuously on the leading hemisphere of a moving bubble, a counterforce that slows the forward motion appears. A formula for particle velocity is presented. The implications for the behavior of drops or bubbles in metallic melts under microgravity are discussed. Author (ESA)

N83-31644# Universidad Politecnica de Madrid (Spain). E.T.S.I. Industriales.

BUBBLE MOTION UNDER REDUCED GRAVITY **c34**

A. Crespo and F. Manuel *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 45-49 refs (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

A method to estimate thermocapillary velocities, based on energy conservation, is presented. Bubble movement due to radiation pressure gradient is estimated for single and distributed bubbles. The effect of sound velocity variation with void fraction and frequency is considered. The escape of the single bubble formed inside a liquid mass by migration due to centrifugal forces of distributed bubbles is studied. The case of the liquid mass moving as a vortex is considered as a limiting situation of nonuniform angular velocity. Bubble velocities due to thermocapillary forces are considerably smaller than predicted by theory, since bubble movement is strongly impeded by surface active substances that create variations in surface tension opposite to those due to the imposed temperature gradient. Estimated velocity due to radiation pressure gradient is very small if the bubble void fraction is so small that the sound speed corresponds to the liquid. Author (ESA)

N83-31645# Centre National de la Recherche Scientifique, Meudon (France). Lab. d'Aerothermique.

ON THERMALLY-DRIVEN MOVEMENT OF DROPS IN MICROGRAVITY CONDITIONS **c34**

A. ElKouraychi, F. Feuillebois, and A. Lasek *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 51-54 refs (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The equations of motion of a liquid drop embedded in a nonmiscible liquid under microgravity conditions were analyzed. A temperature gradient imposed on the outer liquid induces a gradient of surface tension on the surface of the drop. The resulting stresses set the drop in motion. The flow and temperature fields are calculated as expansions for small Marangoni number (analogous to a Reynolds number). The zero order solution yields the velocity of the drop. The deformation is of order 2. It is obtained by solving first the velocity field to order 1. Author (ESA)

N83-31646# Max-Planck-Institut fuer Metallforschung, Stuttgart (West Germany).

OSTWALD RIPENING AND SOLIDIFICATION BEHAVIOR OF NEAR MONOTECTIC ZN-PB ALLOYS **c26**

A. Kneissel (Montanuniversitaet Leoben, Austria), P. Pfefferkorn (Montanuniversitaet Leoben, Austria), and H. Fischmeister *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 55-61 refs (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The feasibility of a Spacelab experiment which maintains a suspension of lead droplets in a zinc-rich liquid matrix and studies the rate of Ostwald ripening without disturbance by segregation was tested. Study of directional solidification of near monotectic Zn-Pb melts under normal gravity shows a region of regular coupled growth in which strings of Pb particles are embedded in the solid zinc. It is shown that the cooling conditions in Spacelab allow the solidification of the alloy without affecting the suspension structure, and that demixing observed in space experiments is not caused by the space environment. A regime of container dimensions and times in which Otswald ripening occurs without disturbance by sedimentation and collisions is identified. The coarsening of Pb droplets is satisfactorily described by basic theory, and diffusivities inferred from the coarsening rates agree reasonably well with zero gravity measurements. Author (ESA)

N83-31647# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Space Simulation.

THE BEHAVIOR OF A METALLIC DISPERSION UNDER MICROGRAVITY CONDITIONS **c34**

G. H. Otto *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 63-69 refs (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

An STS 7 experiment in which a gallium-mercury system with a liquid state miscibility gap is used to study dispersion under microgravity is described. The sample is not solidified, but cooled into the miscibility gap only. The resulting liquid-liquid dispersion and its development upon further cooling are recorded by X-ray transmission photography. Three different cooling rates are used with the same sample. The influence of time and gradient dependent effects (homogenization, droplet growth, Marangoni convection, Stokes' sedimentation) on the stability of the dispersion are considered. Author (ESA)

N83-31648# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Casting of Metals.

PRECIPITATION OF GAS PORES IN METALLIC METALS DURING COOLING UNDER MICROGRAVITY **c26**

H. Shahani and H. Fredriksson *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 71-78 refs Sponsored by Swedish Delegation of Space Research. (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Rocket experiments on pore formation in Al-base alloys were performed. The alloys were melted under high pressure H2-atmosphere on Earth and remelted at low pressure in space. Due to the pressure difference pores were formed. The nucleation and growth of the pores were analyzed as a function of the pressure difference and as a function of alloy composition. Due to the low solubility of hydrogen in aluminum, density is only reduced by a factor of two, but the results indicate the feasibility of space manufacturing of metal foams. Author (ESA)

N83-31649# Ceskoslovenska Akademie Ved, Prague. Inst. of Physics.
ON THE NUCLEATION OF MELTS UNDER MICROGRAVITY CONDITIONS **c76**
C. Barta, A. Triska, V. Ilyukhin (Academy of Sciences, Moscow), and G. Zhukov (Academy of Sciences, Moscow) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 79-83 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Qualitative aspects of processes which occur during the gradual cooling of a multicomponent melt at g=1 and g tends towards 0 are outlined. The suitability of experimental materials for highlighting these processes is evaluated. Results of a Salyut 6 investigation of the recrystallization of Ge-Sb-S glass, and the first and second generation crystals of PbCl2-AgCl and PbCl2-CuCl are discussed. The number of crystal nuclei obtained by spontaneous crystallization under microgravity is an order of magnitude greater than on Earth. It is suggested that the phase diagram usual at g = 1 is only a special case of a gravity dependent phase diagram and that phases inaccessible on Earth may appear not only under the microgravity conditions but also at g>1.
Author (ESA)

N83-31650# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).
SCIENTIFIC GOALS OF THE D1-MISSION
P. R. Sahm and R. Jansen *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 87-93 refs Prepared in cooperation with Technical Hochschule, Aachen (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Experiments in the solidification of metals; monocrystals including materials for electronic applications; boundary layer and fluid transport physics; physical chemistry; and chemical processing are presented. Medical biological, and botanical experiments are discussed. One experiment, in communication - navigation, is microgravity independent. The D1-mission experiments cover the complete range of phenomena from being weakly to highly gravity sensitive. Author (ESA)

N83-31651# European Space Research and Technology Center, Noordwijk (Netherlands).
THE FLUID PHYSICS MODULE: NEW POSSIBILITIES AND APPLICATIONS **c34**
A. Gonfalone and H. Martinides *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 95-97 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The Spacelab fluid physics module, an apparatus for establishing a floating zone between two parallel coaxial disks, in a microgravity environment, is presented. Disturbances are applied to the liquid whose behavior is then observed and recorded on film. The stimuli can be mechanical, thermal or electrical. It is used on the first Spacelab payload to study floating zone stability, Marangoni convection, capillary phenomena and liquid-solid interactions. Improvements to data recording, fluid management and crew interfaces are outlined. Author (ESA)

N83-31652# European Space Research and Technology Center, Noordwijk (Netherlands).
SOUNDING-ROCKET FLIGHT TEST OF AN ACOUSTIC MIXER BY MANUFACTURE OF A LEAD-ZINC EMULSION ALLOY IN MICROGRAVITY **c26**
P. F. Clancy, W. Heide (Battelle Inst., Frankfurt am Main), and D. Langbein (Battelle Inst., Frankfurt am Main) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 99-104 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

An acoustic mixer system capable of mixing immiscible alloys, powder/metal and fiber/metal melts in microgravity was developed and test flown on the TEXUS 5 rocket flight with a lead-zinc immiscible alloy system. The results show that the mixer gives thorough mixing of the melt both before and during the microgravity cooling phase. The particle size distributions obtained in microgravity are different to those obtained in 1 g. Author (ESA)

N83-31653# Erno Raumfahrttechnik G.m.b.H., Bremen (West Germany).
DEVELOPMENT OF ADVANCED HEATING FACILITY CONCEPTS FOR MICROGRAVITY APPLICATION **c09**
J. Schawer *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 105-108 (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Breadboard models of furnaces for microgravity applications, based on electron beam heating and heating by concentric heat pipes were developed. Advantages of an electron beam facility are: electron bombardment is a very efficient source of heat (100 % power utilization); rapid sample heatup; and possibility of operating samples at temperatures > 2000 C. The use of heating zone heat pipes gives excellent isothermality within the operational temperature, with isothermality decoupled from heat input. Heat pipe isothermality is not affected by the sample. Steep temperature gradients are possible without overheating the sample. Use of vapor controlled heat pipe cooling zone means that the isothermality of the cooling zone is decoupled from the heat input. Excellent temperature stability even for poor control and for varying heat input and for varying heat sink conditions is achieved.
Author (ESA)

N83-31654# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
HEAT TRANSFER INDUCED PERFORMANCE CHARACTERISTICS OF GRADIENT TYPE FURNACES **c34**
P. Behrmann and R. Benz *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 109-115 (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

An analytic approach to performance analysis of spaceborne furnaces is outlined. Maximum achievable gradients and means to enhance gradients are evaluated. A strong interaction of performance figures with process parameters is recognized. Examples of this interaction, as well as performance characteristics of an Inconel sample are presented. The applicability of steady state node model calculations to transient aspects of the furnaces is analyzed. Results concerning fluctuations of cooling zone and heating zone temperatures are presented. It is found that high frequency thermal fluctuations are effectively damped.
Author (ESA)

N83-31655# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
AN AUTOMATIC MONOELLIPSOIDAL MIRROR FURNACE FACILITY FOR LONG-TERM CRYSTAL GROWTH ON THE EUROPEAN RETRIEVABLE CARRIER (EURECA) **c76**
J. Stapelmann *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 117-119 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Tha automatic monoellispsoidal mirror furnace facility, an automatic version of a furnace developed for Spacelab D1 mission is presented. The major EURECA requirements concern: vacuum operation; disturbance level of 1 to 10 Hz at 0.000001 g, 10 to 100 Hz at 0.00001 g, > 100 Hz at 0.0001 g; 180 days operation in orbit; and increased vibration loads during launch. Lamp storage and exchange mechanism; sample storage and exchange mechanism; and the data handling system are described. Author (ESA)

N83-31656# Tokyo Inst. of Tech. (Japan).
DEVELOPMENT OF AN ACOUSTIC LEVITATION DEVICE WITH A MIRROR FURNACE **c71**
Y. Ikegami (IHI, Tokyo), E. Mori, and M. Saito (NASDA, Tokyo) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 121-125 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Acoustic levitation in a transparent quartz tube with a mirror furnace was studied in a terrestrial environment. A sample (glass

balloon, 500 mg) is levitated in stable conditions up to 600 C. A sample is continuously levitated during the increase and decrease of temperature by 150 C, or pressure change 250 Pa by controlling the reflector position and gas components, using a microcomputer. Author (ESA)

N83-31657# Commissariat a l'Energie Atomique, Grenoble (France).
TECHNICAL IMPLICATIONS OF A FLIGHT EXPERIMENT DESIGN
J. P. Praizey *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 127-132 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Problems linked to project organization, integration of the experiment in a given flight, and constraints due to microgravity are discussed. Factors which must be considered from the outset of the project include cartridge storage and software design to allow for thermal profile adjustment just before the flight. Vibration, time and energy limitations, use of a sealed cartridge, and use of a multipurpose furnace pose problems for integration. Microgravity alters convective thermal exchange and complicates the control of free volumes. Sample shrinkage during solidification when the melted zone is in tension is discussed. Author (ESA)

N83-31658# Centre National de la Recherche Scientifique, Grenoble (France).
MINIZONE IMAGE FURNACE **c09**
R. PerrierdelaBathie, J. Gosset (CNES, Toulouse), J. C. Hennequin (CNES, Toulouse), and F. Jamin-Changeart (CNES, Toulouse) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 133-134 (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

A laboratory device for melting, using floating zone technology is presented. It uses heat from three 150W halogen lamps focused by ellipsoid mirrors. The lamp holder block is moved by a DC motor and a mechanical reducers assembly with speed variation and control. Maximum diameter of the samples is 5 mm. Melting zone length is 3 to 8 mm. Travel length of the lamp holder is 30 mm. Maximum temperature is 1500 C. Temperature stability is 0.2% for 4hr. Stabilization is achieved in 25 min (1300 C) for material with high thermal conductivity, < 10 min with thermal insulating materials. Thermal gradient with good conductivity material is 100 C/cm, with medium conductivity materials is 300 C/cm, and with insulating materials is 500 C/cm.
Author (ESA)

N83-31659# Centre National d'Etudes Spatiales, Toulouse (France).
ISOTHERMAL GRADIENT HEAT-PIPES SPACE FURNACE (500 TO 1000 DEG C) **c09**
G. Cambon and F. Jamin-Changeart *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 135-136 (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

A spaceborne vacuum furnace for investigations of crystal growth and alloy processing is presented. The furnace comprises three isothermal heating zones, each with nine sodium heat pipes (pencil type) inserted in a diffusing block. The experimental area is 22.5 x 375 mm. Absolute temperature accuracy is + or - 2 C. Heat pipe isothermicity is + or - 0.5 C. Temperature constancy is 0.25 C. Thermal gradient is 100 C/cm. Author (ESA)

N83-31660# Genoa Univ. (Italy). Ist. di Mineralogia.
RECONSTRUCTION BY MULTIDIRECTIONAL HOLOGRAPHIC INTERFEROMETRY OF THE CONCENTRATION FIELD IN A SUPERSATURATED SOLUTION NEAR A GROWING NaClO3 CRYSTAL **c76**
F. Bedarida, L. Zefiro, P. Boccacci (ESA, Paris), and C. Pontiggia *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 139-143 refs Sponsored by CNR and ESA (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Holographic interferometric investigation of crystal growth from solution, in space, is discussed, and the experimental procedure for multidirectional interferometry is outlined. A double exposure multidirectional hologram of the growing process is recorded; it stores on a single plate N different holograms corresponding to as many projections along N directions of the refractive index variation field. The N images are processed by an image elaboration system that gives the gray levels corresponding to the intensity values on each point of the image. These data are the input of a computer program which reconstructs a three dimensional field from its projections. Although unidirectional interferometry is suitable for space applications, information is limited to the mean value of the refractive index. The multidirectional technique presents many more technical problems for spaceborne applications. Author (ESA)

N83-31661# Lyon-1 Univ., Villeurbanne (France).
STATIONARY AND OSCILLATORY INSTABILITIES FOR MIXTURE SUBJECTED TO SORET EFFECT IN VERTICAL CYLINDER WITH AXIAL TEMPERATURE GRADIENT **c34**
D. Henry and B. Roux (Inst. de Mecanique des Fluides, Marseille) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 145-152 refs Sponsored by CNES (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The convection arising from the amplification of infinitesimal perturbations in a cylindrical cell, used to measure Soret coefficient was studied. A Galerkin method used to compute marginal stability for stationary and oscillatory perturbations of axisymmetric and asymmetric modes. Universal results are given in terms of the thermal diffusion parameter, especially for an aspect ratio of 1/6, corresponding to an apparatus to be used in microgravity environment to measure the Soret coefficient of a AgI-KI mixture. Results indicate that a measure on Earth of a negative Soret coefficient is very difficult, but in reduced gravity it seems possible to find a reasonable aspect ratio corresponding to stable situations. Author (ESA)

N83-31662# Technische Hochschule, Aachen (West Germany). Inst. fuer Physikalische Chemie.
THERMODYNAMICS OF IRREVERSIBLE PROCESSES IN MOLTEN SALTS: PROBLEMS OF INTERDIFFUSION MEASUREMENTS UNDER MICROGRAVITY **c77**
J. Richter and A. Hahne *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 153-160 refs Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The experimental and theoretical suitability of molten salts for the calculation in space of the Onsager and friction coefficients of irreversible processes is discussed. Results are given for the molten KNO3 + AgNO3 mixture at 300 C and the experimental set up and the filling procedure under microgravity are presented. The molten NaNO3 + AgNO3 system is advocated for a Spacelab interdiffusion experiment since it is transparent and optical measurements are feasible. The system has a low melting point and is not hygroscopic. Reference data are available for the whole composition range, as are all the data needed to calculate friction coefficients. Author (ESA)

N83-31663# Technische Universitaet, Clausthal-Zellerfeld (West Germany). Inst. fuer Nichmetallische Werkstoffe.
REACTIONS IN GLASS MELT SYSTEMS **c27**
G. H. Frischat, M. Braedt, and W. Beier *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 161-165 refs Sponsored by Bundesministerium fuer Forschung und Technologie and DFVLR (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Rocket-borne investigations of interdiffusion between glass melts of different composition, corrosion of silica glass by melts; and self diffusion in glass melts are summarized. Kinetic results for glass melt systems are given. Experimental design and the importance of carrying out experiments in microgravity are discussed. Author (ESA)

N83-31664# Rockwell International Corp., Thousand Oaks, Calif.
LDEF EXPERIMENTS: CRYSTAL GROWTH BY A SOLUTE DIFFUSION PROCESS **c76**
M. D. Lind and K. F. Nielsen (Technical Univ. of Denmark, Lyngby) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 167-174 refs Sponsored by Space Flight Corporation of Denmark Ltd. (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

An LDEF investigation of the diffusion of two reactant solutions toward each other through a region of pure solvent in which they react chemically to form single crystals is outlined. Calcium carbonate, lead sulfide and TTF-TCNQ are used. The experiments are expected to yield crystals superior in size and in structural and compositional perfection to those obtained on Earth. The crystal growth reactors, reactor enclosure, process controller, and electric power supply system are described. Thermal design requirements are discussed. Author (ESA)

N83-31665# Tokyo Univ. (Japan). Dept. of Aeronautics.
COMBUSTION EXPERIMENTS UNDER MICROGRAVITY **c25**
S. Kumagai *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 177-182 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Microgravity experiments on droplet combustion carried out from 1945 to 1982 are reviewed. Drop test facilities are described. Author (ESA)

N83-31666*# California Univ., San Diego.
FUNDAMENTAL COMBUSTION EXPERIMENTS IN MICROGRAVITY **c25**
A. L. Berlad *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 183-190 refs Sponsored by NASA (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Technical bases for microgravity combustion experimentation are identified for important areas of study. The analyses which underlie the need for microgravity experiments of single and two-phase autoignitions, explosions, thermokinetic oscillations, and kinetic oscillations are emphasized. It is shown that turbulent combustion experiments at microgravity are needed and that heterogeneous kinetics are a centrally important process in a number of classic experiments. Author (ESA)

N83-31667# Princeton Univ., N. J. Dept. of Mechanical and Aerospace Engineering.
STUDIES OF EXPERIMENTS ON DROPLET BURNING AT REDUCED GRAVITY **c25**
F. A. Williams *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 191-196 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The advantages of reduced gravity investigation of droplet burning are discussed. Drop tower tests of droplet combustion are summarized. A design for droplet burning experiments in space shuttles is presented. A preloaded syringe dispenses the droplet which is dislodged mechanically or electrostatically. The positioning is electrostatic, with six electrodes operated individually or in pairs, manually or with servocontrol. After the droplet is at rest and the fields turned off, the retractable ignition electrodes are energized. The combustion is recorded by camera with backlight designed to give accurate droplet size. Author (ESA)

N83-31668# Brussels Univ. (Belgium). Chimie-Physique EP.
STUDY OF THE SURFACE TENSION MINIMUM OF AQUEOUS ALCOHOL SOLUTIONS AND MOVEMENTS AT THE AIR-SOLUTION INTERFACE **c34**
G. Petre, M. Cl. Limbourg-Fontaine, and J. C. Legros *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 199-200 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Measurements which indicate that aqueous long chain alcohols have a surface tension which presents, at equilibrium, a minimum of surface tension as a function of temperature are summarized. It is verified that in an air-solution interface submitted to a temperature difference T1-T2, movements are induced from hot to cold regions when T1 and T2 are below the temperature Tmin corresponding to that minimum of surface tension. The movements are from cold to hot region when T1 and T2 are above Tmin. Author (ESA)

N83-31669# Brussels Univ. (Belgium). Chimie-Physique EP.
THE INFLUENCE ON THE MARANGONI EFFECT OF A SURFACE TENSION MINIMUM AS A FUNCTION OF TEMPERATURE IN MICROGRAVITY CONDITIONS **c34**
J. C. Legros, G. Petre, and M. Cl. Limbourg-Fontaine *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 201-203 refs Sponsored by Fondation Universitaire D. et A. Van Buuren and Fonds National de la Recherche Scientifique (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

A TEXUS 8 rocket-borne investigation of the influence of a surface tension minimum on Marangoni convection is described. Ground test results are given. The movements induced in diluted n-heptanol-water are studied in the TEXUS flight. In microgravity, the movements induced for temperatures higher than the temperatures corresponding to the surface tension minimum are expected to go in the opposite direction to the movements induced by the gravity field. In 1-g conditions this Marangoni convection, in competition with the density induced movements, yields contrarotative superposed cells. Author (ESA)

N83-31670# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany).
FREE-SURFACE VIBRATION OF A FLOATING ZONE INDUCED BY SURFACE TENSION DRIVEN OSCILLATING FLOW **c34**
Ch.-H. Chun, W. Wuest, and J. Siekmann (Essen Univ.) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 205-211 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The interaction between the oscillating thermal Marangoni convection in a cylindrical liquid bridge heated from the upper bound and the vibration of the free surface was studied by analyzing temperature oscillations due to the flow oscillation and the deflection of a laser sheet passing through the liquid bridge, employing a fast Fourier transformation analyzer. The frequencies of the free surface vibrations are strictly the same as those of the temperature oscillations and can be clearly separated from those of the capillary waves. A physical interpretation of the shape of the free surface deformation is given. Author (ESA)

N83-31671# Giessen Univ. (West Germany). Inst. fuer Physik.
MEASUREMENT OF THE CRITICAL MARANGONI NUMBER IN A FLOATING ZONE UNDER REDUCED GRAVITY **c34**
D. Schwabe and A. Scharmann *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 213-218 refs (For primary document see N83-31637 20-12)
(Contract BMFT-01-QV-148-ZA-SN-SLN-7786)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The oscillatory state of thermocapillary convection in floating zones is described. The results of an experiment under reduced gravity in the TEXUS 5 rocket experiment are reported. The Marangoni number for the transition from laminar to oscillatory thermocapillary convection under microgravity is on the order of 9000. Author (ESA)

N83-31672# Naples Univ. (Italy). Inst. of Aerodynamics.
INFLUENCE OF GEOMETRY ON OSCILLATORY MARANGONI FLOWS **c34**
R. Monti, L. G. Napolitano, and G. Russo *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 219-228 refs Sponsored by CNR, MPI and Company LABEN S.p.A., Milan (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The dependence of oscillation onset in Marangoni flow on the aspect ratio and shape factor of the floating zone was evaluated for different Prandtl number silicon oils. The performance of the floating zone was studied and the relationship between the

governing quantities was validated for regimes occurring during the heating and the cooling processes. The heat transfer efficiency decrease, in oscillatory Marangoni motion, was experimentally demonstrated. Results show that convective effects induced by the Marangoni flow are proportional to the Peclet number at steady Marangoni flow. Author (ESA)

N83-31673# Naples Univ. (Italy). Inst. of Aerodynamics U. Nobile.
INFLUENCE OF SURFACE TENSION MINIMUM ON SURFACE AND BUOYANCY DRIVEN FLOWS IN STOKES REGIME c34
L. G. Napolitano and C. Golia *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 229-233 refs (For primary document see N83-31637 20-12)
(Contract CNR-82/002/SAS)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The qualitative behavior of combined free convection of liquids when the surface tension dependence on the temperature shows a minimum is discussed. The analytical solution for a plane geometry is derived. It entails the solution, by truncation, of two infinite series of linear algebraic equations. By assuming that the flow regime is of the Stokes type, solution for the case of a liquid-gas system is given in terms of the stream function expressed as a sum of infinite series of complex biorthogonal eigenfunctions. Author (ESA)

N83-31674# Madrid Univ. (Spain). Fisica Fundamental.
BUOYANCY-THERMOCAPILLARY CONVECTION: THE ROLE OF INTERFACIAL DEFORMATION c34
M. G. Velarde and J. L. Castillo *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 235-237 refs Sponsored by Spanish Comision Asesora de Investigacion Cientifica y Tecnica (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Linear (normal mode) and energy stability analyses were developed to delineate regions of transition from a motionless state to steady patterned convection, oscillatory convection and finite amplitude convection in a binary liquid layer subjected to thermal constraints in double diffusion when one of the boundaries is open to the ambient air. The role of the deformation of the open interface (liquid-air) was studied. Explicit results are obtained in terms of the crispation (capillary) number. Results for the zero gravity problem (Rayleigh numbers set to zero) are also obtained. Author (ESA)

N83-31675# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Mechanical and Aerospace Engineering.
NUMERICAL SOLUTIONS OF FLOATING-ZONE THERMOCAPILLARY FLOWS c34
Being-I Fu and S. Ostrach *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 239-245 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

A finite difference scheme was used to determine the axisymmetric flow and temperature fields in a half floating-zone configuration. The effects of the surface tension Reynolds number, Marangoni number, and Prandtl number on the thermocapillary flow under weightless conditions were determined. The range of parameters considered includes those for actual growth of silicon crystals. A strongly coupled nonlinear numerical scheme and variable grid size were used to obtain solutions at the appropriate large ranges of parameters. The effects of buoyancy, surface heat loss, and aspect ratio are also investigated. The flows are found to form a single cell patern with the core located nearer the free surface. The axial velocity near the free surface is two to four times larger than near the axis. Author (ESA)

N83-31676# Universidad Politecnica de Madrid (Spain). Inst. of Aeronautics.
ALMOST CYLINDRICAL ISOROTATING LIQUID BRIDGES FOR SMALL BOND NUMBERS c34
J. M. Vega and J. M. Perales *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 247-252 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Almost cylindrical bifurcating stationary shapes, with a cylindrical volume, are calculated for A-Ac is much less than 1, where A is the slenderness of the bridge, and Ac is a critical value which depends on the rotational Weber number. It is seen that the bifurcation is always subcritical, i.e., the bifurcating noncylindrical shapes appear for A < Ac. The effect of a small axial gravity, i.e., a small gravitational Bond number (B) is also considered. It is seen that Ac(0,A) - Ac(B,A) is on the order of B to the power 2/3 for amphora modes, and of the order of Bsq for nonaxisymmetric modes. Author (ESA)

N83-31677# Universidad Politecnica de Madrid (Spain). Lab. de Aerodinamica.
CONSERVATION LAWS FOR LIQUID BRIDGES c34
I. Da-Riva *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 253-260 refs Sponsored by Spanish Space Research Commission (CONIE) (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Conservation laws for an inviscid liquid bridge set in motion by conservative forces are given in integral form. The overall motion of the bridge in the presence of unexpected or uncontrolled disturbances can be monitored in a computational solution of the problem as an accuracy check. The existence of conserved properties not deductible in the classical way is revealed. Although the analysis concerns the case of axial and constant gravity it can be applied, with minor refinements, when the gravity field varies with time in both direction and intensity. Author (ESA)

N83-31678# Universidad Politecnica de Madrid (Spain). Lab. de Aerodinamica.
THE BREAKING OF AXISYMMETRIC NONCYLINDRICAL LIQUID BRIDGES c34
J. Meseguer, A. Sanz, and D. Rivas *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 261-265 refs Sponsored by Spanish Space Research Commission (CONIE) (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The dynamic behavior of axisymmetric inviscid liquid bridges near the stability limit of minimum volume was studied using a one dimensional slice model. Although model validity is questionable regarding short bridges, it seems to be appropriate for sufficiently slender bridges. Interface evolution of noncylindrical configurations as well as overall data (such as the breaking time, or partial volume of the resulting drops) which can be easily verified experimentally, are obtained. Author (ESA)

N83-31679# Universidad Politecnica de Madrid (Spain). Inst. of Aeronautics.
STABILITY OF AXISYMMETRIC LIQUID BRIDGES c34
I. Martinez *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 267-273 refs Sponsored by Spanish Commission for Space Research (CONIE) (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

A simple formulation and a compact set of graphic data are presented for the equilibrium shapes and stability limits of axisymmetric liquid bridges. The stability analysis is based on the bifurcation of static configurations and gives the minimum liquid volume a bridge can hold, and the breaking mode. The end supports considered are: equal disks, unequal disks, free edge plates and paraboloidal supports. Long zones loose their stability through an asymmetric mode and yield two distinct drops, whereas short zones tend to neck in a symmetric way and yield similar drops. Imperfections imposed on equal-disk bridges cause reduction of the stability limits, and bias in the otherwise symmetric structure. When the bridge borders are not anchored to sharp solid edges, the stability limits are reduced by half (in achievable slenderness, for instance). Author (ESA)

N83-31680# Commissariat a l'Energie Atomique, Grenoble (France). Lab. d'Etude de la Solidification.
IMPLICATIONS OF THE LACK OF WETTING AT THE MONO-

TECTIC GROWTH FRONT **c26**

B. Derby *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 277-280 refs Sponsored by ESA (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Repulsive forces, caused by lack of wetting, which may affect the microstructure of microgravity solidified alloys are discussed. Sounding rocket experiment and analytical evidence indicates that in nonwetting hypermonotectic systems, a segregation of the second liquid phase can occur by a repulsive force from the solidifying interface. The action of such a force is masked under terrestrial conditions by the dominant density segregation. It is suggested that the Zn-Bi system allows wetting under microgravity, but experimental results are unclear. Author (ESA)

N83-31681# Brussels Univ. (Belgium). Chimie-Physique 2.

CONVECTION-MARANGONI EFFECTS IN SOLIDIFICATION-MICROGRAVITY **c26**

A. Sanfeld, A. Steinchen, B. Billia (Aix-Marseille Univ., France), and L. Capella (Aix-Marseille Univ., France) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 281-283 refs Sponsored by Belgian Ministry of National Education, ESA, NATO and Les Instituts Solvay-Belgium (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The influence of convection due to the difference of densities between solid and melt and of Marangoni effects on the morphological stability of the solidification front is investigated under microgravity. A destabilizing contribution is predicted for large velocities of growth in Newtonian or Maxwellian systems. Marangoni convection might be coupled with the morphological contribution in oscillatory regimes, for large wavelengths. Author (ESA)

N83-31682# Erlangen-Nuremberg Univ. (West Germany). Inst. fuer Werkstoffwissenschaften, Kristallabor.

INVESTIGATION OF CONVECTIVE FLOWS IN MODEL SYSTEMS OF DIRECTIONAL SOLIDIFICATION CONFIGURATIONS **c34**

G. Mueller and G. Neumann *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 285-294 refs Sponsored by Bundesministerium fuer Forschung und Technologie (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Convective flows in water in a vertical cylindrical test cell heated from below were studied. A sequence of different stable flow configurations is found. The time dependent convection is characterized by well defined frequencies. Water results were compared with results of the directional solidification of InSb by the vertical Bridgman technique. A clear correlation of material inhomogeneities and unsteady thermal convection is possible using theoretical results of the critical Rayleigh number (Ra). The first flow configuration which occurs at slightly supercritical Ra is a steady unicellular antisymmetric roll. At higher Ra staggering of rolls occurs only in vertical direction. The shape and aspect ratio of the container can influence the flow transitions. Author (ESA)

N83-31683# Commissariat a l'Energie Atomique, Grenoble (France).

ORDER OF MAGNITUDE ANALYSIS OF SOLUTE MACROSEGREGATION IN CRYSTAL GROWTH FROM THE MELT **c76**

J. J. Favier and D. Camel *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 295-299 refs (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The influence of buoyancy driven thermal convection on macrosegregation in a typical horizontal Bridgman crystal growth configuration is analyzed for the whole range of possible values of the parameters. Two reference quantities appear: L, the length scale for the fluid flow field; Ln, the extent of the boundary layer for solute transport. While Ls mainly depends on the geometry of the cell, Ln depends on the data of the problem, and obeys two different scaling laws according to the nature of the controling driving force. Two boundary layer transport regimes are distinguished: a convective-diffusive regime, and a purely diffusive regime. The influence of the experimental parameters, and particularly the gravity level, on longitudinal macrosegregation is described. The possibility of producing homogeneous crystals of a given size and dope level is discussed as a function of the available gravity conditions. Author (ESA)

N83-31684# Ecole Nationale Superieure d'Electrochimie et d'Electrometallurgie, Grenoble (France). Lab. de Thermodynamique et Physico-Chimie Metallurgiques.

MEASUREMENTS OF DIFFUSION COEFFICIENT OF COPPER IN LIQUID LEAD IN MICROGRAVITY BY THE GRAIN BOUNDARY GROOVING TECHNIQUE **c26**

O. Minster, C. Vahlas, C. Senillou, L. Coudurier, N. Eustathopoulos, and P. Desre *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 301-306 refs (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Results concerning the diffusion coefficient of copper in liquid lead, obtained in microgravity and on Earth are presented. Linear dimensions of the grooves, formed in the grain boundaries of bicrystals of Cu in equilibrium with Pb-Cu alloys, were measured after an annealing time of 8 hr, at 4 temperatures between 900 and 1200 K. Comparison of groove dimensions obtained on Earth and in microgravity indicates that the apparent diffusion coefficient on Earth is higher (by 40%) than that obtained in microgravity. This difference is attributed to microconvection produced in the vicinity of the solid-liquid interface by solute concentration gradients parallel to the interface. Author (ESA)

N83-31685*# Gelles (S. H.) Associates, Columbus, Ohio.

LOW-GRAVITY EXPERIMENTS ON LIQUID PHASE MISCIBILITY GAP (LPMG) ALLOYS: MATERIALS EXPERIMENTS ASSEMBLY (MEA) **c26**

S. H. Gelles, A. J. Markworth (Battelle Columbus Laboratories, Columbus), and C. E. Mobley (Ohio, State Univ. Columbus) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 307-312 refs (For primary document see N83-31637 20-12)

(Contract NAS8-32952)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Space shuttle experiments which study the massive separation which occurred during sounding rocket Al-In alloy tests are described. The gradient cool experiment studies surface tension driven droplet migration and particle pushing in an LPMG alloy. Isothermal experiments on the Te-Tl alloys test the hypothesis that LPMG systems with low surface energies produce relatively fine, and uniform emulsions and dispersions. It also examines the effect of droplet concentration on phase separation kinetics. Isothermal plunger experiments on Al-In alloys determine whether surface tension driven convection currents originating at a free surface contribute to massive separation. They ascertain whether In-rich droplets migrate under the action of a temperature gradient when they are not influenced by the crucible walls. Author (ESA)

N83-31686*# Rensselaer Research Corp., Troy, N. Y. Materials Engineering Dept.

CONVECTION EFFECTS AT SOLID-LIQUID INTERFACES: INFLUENCE OF GRAVITY **c26**

M. E. Glicksman, Q. T. Fang, S. R. Coriell (NBS, Washington, D.C.), and R. F. Boisvert (NBS, Washington, D.C.) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 313-317 refs Sponsored by NASA (For primary document see N83-31637 20-12)

Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The stability of the flow between two vertical, infinite, rigid, coaxial cylinders held at different temperatures is analyzed by linear stability theory. For a Prandtl number of 22.8 and a radius ratio of 0.02, the flow is unstable to an axisymmetric perturbation at a critical Grashof number of 2150; the wave speed of the instability is comparable to the maximum velocity of the unperturbed flow. When the rigid outer cylinder-fluid interface is replaced by a crystal-melt interface which can change shape, two new modes of instability occur at lower Grashof numbers. Author (ESA)

N83-31687# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Casting of Metals.

THE EFFECT OF THE NATURAL CONVECTION ON THE SOLID-

IFICATION OF METALLIC ALLOYS **c26**
H. Fredriksson *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 319-323 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Gravitational and convection effects on solidification and element distribution in a Pb-Sn dendritic alloy are analysed using a one dimensional model. Directional solidification perpendicular to the gravity force (A); directional solidification with a liquid-solid region perpendicular to the gravity force (B); and directional solidification with a liquid region against the gravity force (C) are considered. For (A) a decrease of gravity by a factor of 10,000 increases columnar zone length 2 to 3 times. Macrosegregation in (B) is greatly reduced when gravity is reduced. In (C) a much smaller temperature gradient can be used to avoid freckles if gravity is reduced. Author (ESA)

N83-31688# Academy of Sciences (USSR), Moscow. Baikov Inst. of Metallurgy.
EXPERIMENTS ON CRYSTALLIZATION OF SEMICONDUCTORS ABOARD SALYUT 6: SOYUZ ORBITAL COMPLEX **c76**
V. S. Zemskov, M. R. Raukhaman, and I. N. Belokurova *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 325-329 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Spaceborne investigations of the crystallization of Ge-Si solid solution (from vapor phase) and InSb, and InSb-InBi alloys (from the melt) are summarized. Data on crystallization of Ge-Si by chemical transport reaction method show the pure diffusive mechanism of mass transport in microgravity environment. On-seed growth of Te doped InSb single crystals in space can occur without contact between the melt and the ampule walls, which provide high structural perfection of the neck region. The dominating mechanism of mass transfer in the melt is diffusion, with Marangoni convection induced in the neck region. The crystallization features of InSb-InBi alloys indicate a specific segregation behavior of the alloy constituents depending on microacceleration. Author (ESA)

N83-31689# Technische Hochschule, Aachen (West Germany).
SOLIDIFICATION FRONT DYNAMICS IN MODEL SYSTEMS **c76**
A. Ecker and P. R. Sahm *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 331-336 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

A ground based preparatory experiment for the Spacelab D1 mission investigation of boundary layers in transparent solidifying melts (GETS experiment) is outlined. Thermosolutal boundary layers which interact with macroscopic convective melt movement are studied. Pure and alloyed succinonitrile probes are investigated. An optical diagnostic experiment system is mounted around a transparent mold that is controllable with respect to temperature gradients, velocity of the melt and growth velocities of the crystallization front. Results are checked against stability criteria of the solidification front. Author (ESA)

N83-31690# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Casting of Metals.
SOLDERING UNDER MICROGRAVITY **c26**
T. Carlberg and M. Liljendahl *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 337-342 refs Sponsored by Swedish Board for Space Activities (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Microgravity soldering experiments were performed in mirror furnaces on the TEXUS 5 sounding rocket. Capillary spreading of Sn-Ag solder between Cu-tubes, dissolution of the base material and interaction between solder and base material during solidification were studied. Results were treated by classical surface tension theory and diffusion calculations. Microgravity promotes capillary filling of wider gaps during soldering in the system Sn-Ag-Cu. Small differences in the temperature cycle have a strong influence on the interaction between the solder and the base material during dissulution and solidification. Convection does not influence dissolution. Author (ESA)

N83-31691# Politecnico di Milano (Italy). Dept. di Chimica Fisica Applicata.
AN ANALYSIS OF THE DRIVING FORCES IN LIQUID PHASE SINTERING **c26**
P. M. Ossi, F. Rossitto, R. Roberti, and G. Silva *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 343-345 refs Sponsored by CNR (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The relevance of capillary forces in the rearrangement and densification of metallic powders and wires was assessed by studying the first stage of the liquid phase sintering process. The force-balance equation was studied in order to evaluate the various contributions for the different model configurations. The meniscus shapes were evaluated by integrating the Young-Laplace equation. The liquid phase sintering experiment included in the TEXUS 8 payload is presented. The experiment evaluates the capillary forces quantitatively. Author (ESA)

N83-31692# Politecnico di Milano (Italy).
ADHESION OF METALS EXPERIMENT SIMULATION AND GROUND-BASED REFERENCE TEST RESULTS **c26**
F. Rossitto, P. G. Sona (Centro Informazione Studi Esperienze), G. Grugni (Centro Informazione Studi Esperienze), and G. Ghersini (Centro Informazione Studi Esperienze) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 347-351 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The Spacelab 1ES340 experiment (adhesion of metals)and the status of the ultrahigh vacuum facility are reviewed. The phenomenological model used in the computer simulation is discussed together with ground reference test results. The method for extracting the value of the surface energy per unit surface area from the experimental data is presented. In the experiment a small metallic sphere collides with a metallic target and the adhesion phenomena are investigated by measuring the restitution coefficient, the contact time and the time evolution of the contact force as a function of the impact velocity of the colliding bodies. Computer simulation and ground test results indicate that the surface energy per unit surface area of macroscopic colliding bodies can be deduced from impact data from the experiment performed in a microgravitational environment. The phenomenological model is a good support for the one parameter fit of the experimental data. Author (ESA)

N83-31693# Maschinenfabrik Augsburg-Nuernberg A.G., Munich (West Germany). Neue Technologie.
SKIN TECHNOLOGY: FUNDAMENTALS AND APPLICATIONS **c26**
H. Sprenger *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 353-358 refs Sponsored by Bundesministerium fuer Forschung und Technologie (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The use of skin technology to improve the quality of intricately shaped parts under microgravity is discussed. Experiments show that prevention of forces due to the volume increment of metallic alloys is the most important condition for successful skin casting. Other causes of shape deformation can be eliminated by suitable preparation of skin coated specimens. Thin oxide skins can be applied in Earth-bound technologies as separating layers between aggressive media, especially reactive melts, and can serve as substitutes for crucibles in cases where increased heat flow from or to liquid alloys is required, e.g., for quenching. Liquid skin technology is recommended for applications in which high undercoolings of melts are envisaged for generating more homogeneous or metastable structures with unique physical properties.
Author (ESA)

N83-31694# Battelle Inst., Frankfurt am Main (West Germany).
OSCILLATORY CONVECTION IN A SPHERICAL CAVITY DUE TO g-JITTER **c34**
D. Langbein *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 359-363 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The convection caused by residual acceleration in axial direction in a spherical cavity heated at the equator and cooled at the poles is investigated. The spherical cavity is used as a first order model of the melting zone in a typical crystal growth experiment under microgravity. The resulting shift of the isotherms is calculated. If in order to avoid striations of the growing crystal a shift of the solidification isotherm by < 1 micron is required, the amplitude of residual accelerations of 1 and 10 Hz must be < 0.000001 and 0.0001 g respectively. Author (ESA)

N83-31695# Commissariat a l'Energie Atomique, Saclay (France).
CRITICAL POINT PHENOMENA IN FLUIDS c25
D. Beysens *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 367-376 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Phase transition through broken symmetry, and Landau theory are introduced. The asymptotic behavior of the main diverging quantities are given, from the Landau theory and from more rigorous calculations including the fluctuations. Behavior not very close to the critical point is examined (corrections-to-scaling). Critical dynamics, and experimental techniques are reviewed. Nucleation, spinodal decomposition, shear flow phenomena, and critical wetting are discussed. Gravitational effects are considered. Author (ESA)

N83-31696# Amsterdam Univ. (Netherlands). Van der Waals Lab.
OPTICAL INVESTIGATION OF CRITICAL BEHAVIOR IN SIMPLE FLUIDS AT REDUCED GRAVITY c74
P. H. Huijser, A. C. Michels, and N. J. Trappeniers *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 377-384 refs Sponsored by Netherlands Agency for Aerospace Programs (NIVR) (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

A full-scale engineering model for a Spacelab experiment on critical behavior in a simple fluid under strongly reduced gravity was built. The proposed optical techniques, elastic light scattering and interferometry, are noninvasive to the critical sample conditions, yield detailed quantitative information on well defined physical quantities and allow visual investigation of the underlying transient processes. The feasibility of a Spacelab study of critical behavior in terms of critical temperature, critical density, and isothermal compressibility is discussed. Ground based test results are encouraging, but no arrangement for conducting the experiment on Spacelab is available. Author (ESA)

N83-31697# Ruhr Univ., Bochum (West Germany). Inst. fuer Physikalische Chemie 2.
ADSORPTION BEHAVIOR OF PURE FLUIDS NEAR THE GAS-LIQUID CRITICAL POINT c25
G. H. Findenegg *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 385-391 refs (For primary document see N83-31637 20-12)
(Contract BMFT-01-QV-070-ZA/SN)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The interface between a nonreactive solid and a fluid near its critical point was investigated. Whereas the interface between near critical fluid phases disappears as the critical point is approached through the range of two-phase states, the interface between a near critical phase and a noncritical phase exhibits pronounced adsorption phenomena, due to the long range of the coherence length of density fluctuations in the critical region. The theoretical background of these phenomena is discussed, using Widom's theory. Experimental measurements for the adsorption of ethylene, and SF6 on the basal plane of graphite are reviewed. An apparatus for extending these measurements to the near critical region of pure fluids in a low gravity environment is described. Author (ESA)

N83-31698# Central Electricity Research Labs., Leatherhead (England).
ELECTROLYTE SOLUTIONS NEAR THE CRITICAL POINT OF WATER: A REVIEW AND PROPOSAL FOR STUDIES UNDER MICROGRAVITY CONDITIONS c25
D. J. Turner *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 393-400 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Data on molal volumes, molal compressibilities, heat capacities of ions in water, and on conductance are reviewed for NaCl solutions along the SVP curve and in supercritical fluid just above the critical point. They are rationalized using a two state model which treats the solvent as either fully compressed by the ions or as free solvent. A conductance study on aqueous NaCl solutions at a temperature just below critical is proposed. Conductance equipment developed for a TEXUS flight is described. The TEXUS experiment establishes density and concentration gradients and varies the density continuously. Author (ESA)

N83-31699# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Advanced Program Div.
THERMAL CONDUCTIVITY MEASUREMENT ON FLUIDS UNDER MICROGRAVITY USING HOLOGRAPHIC INTERFEROMETRY c25
K. Wanders, G. Goerler, and H. Steinbichler (Steinbichler Lab.) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 403-408 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Transient hot-wire and holographic interferometer investigation of thermal conductivity in fluids on board Spacelab is proposed. The principles of the techniques are outlined and ground based simulations of microgravity investigations are described. The benefits of eliminating the effects of convection are discussed. Silicone oil is advocated for microgravity simulation. Author (ESA)

N83-31700# Academy of Sciences (USSR), Moscow. Inst. for Space Research.
THE MAIN RESULTS OF THE SPACE MATERIAL SCIENCE EXPERIMENTS WITHIN THE FRAMEWORK OF INTERCOSMOS PROGRAM
L. L. Regel *In* ESA Mater. Sci. for Microgravity Jun. 1983 p 409-415 (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Results of Salyut materials science experiments are summarized. In microgravity chemical gas transport is strictly controlled by diffusion, the role of convection is insignificant. Free sphere crystal formation is possible in space. The values of effective diffusion coefficients were obtained in microgravity in Al-Cu systems. The growth instability of Zn single crystal faces in zero-gravity is more than on the Earth. Semiconductor single crystals grown in space have a more perfect structure than Earth grown controls. Germanium-antimony-sulfur glass was remelted in space, giving a more homogeneous product. Foamed aluminum produced in space is more porous, less coalescent. The distribution of indium inclusions in an aluminum matrix changes depending on the temperature and the time of heating and the crystallization conditions. Author (ESA)

N83-31701# Academy of Sciences (USSR), Moscow. Inst. for Space Research.
SOLIDIFICATION OF PbSn ALLOYS UNDER MICROGRAVITY CONDITIONS c26
L. L. Regel, I. V. Barmin, A. M. Duranchenko, and L. Oyunbilling *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 417-420 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The effect of microgravity on homogenizeation of metal melts and on bulk crystallization of Pb-Sn alloys was studied on Salyut 6. Results were compared with Earth grown samples. In the Earth-grown samples the melt is fully mixed; in the space samples a diffusion mode prevails. Space and Earth samples differ in the distribution of equilibrium structural components and also in the relative content and bulk distribution of a light phase in the sample. The development of the light phase is observed in both samples (grown according to the high temperature cyclogram). Sample porosity is higher in the space sample; pores are smaller

and are more uniformly distributed over the bulk of the sample.
Author (ESA)

N83-31702# Academy of Sciences (USSR), Moscow. Inst. for Space Research.
PERIODIC CRYSTALLIZATION OF BINARY MELTS UNDER DIFFUSION CONTROLLED MASS TRANSFER **c76**
L. L. Regel and Nguyen Thanh Nghi *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 421-427 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

The peculiarities of crystallization from the liquid phase under purely diffusion mass transfer conditions leading to the macroperiodic variations of crystal composition and structural perfection are considered. The results of crystal growth experiments in which the periodic composition distribution with large period and amplitude of fluctuations were observed are given. Criteria for the choice of technological parameters of growth process, which take into account phase diagram and component diffusion coefficients of concrete systems, in order to prevent macroinhomogeneity in the crystals grown, are discussed. Author (ESA)

N83-31703# Academy of Sciences (USSR), Moscow. Inst. for Space Research.
DIRECTIONAL CRYSTALLIZATION OF Pb Te UNDER MICROGRAVITY CONDITIONS **c76**
L. L. Regel, Nguyen Thanh Nghi, and O. I. Rachmatov *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 429-433 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

Some PbTe undoped single crystals were grown by directional crystallization from partially remelted cylindrical ingots in the 100 direction in the Salyut furnace under microgravity conditions and on Earth. Surface morphology, structural perfection and electrical physical parameters of the Space and Earth grown crystals were compared. Differences in morphological characteristics of space and Earth grown crystals are found. Significant inhomogeneities observed in space and Earth-grown ingots indicate the non-steady-state of the growth process. Author (ESA)

N83-31704# National Defense Univ., Washington, D. C.
POLICY AND ORGANIZATION: THE NEXT STEP IN THE NATIONAL SPACE PROGRAM
Cass Schichtle 1983 215 p
(AD-A127012) Avail: NTIS HC A10/MF A01 CSCL 05/4

A comprehensive national space policy is outlined that establishes realistic goals for the civilian space agency, as well as the establishment of a command within the Air Force to operationally control military space assets. Addressed is the National Space Program, its confusing history, its current issues, and its probable future. The focus is on the government agencies charged with leading this nations's public and military programs, the National Aeronautics and Space Administration (NASA), and the Department of Defense (DOD), respectively. Although the legal role each agency plays can be found in the Space Act of 1958, the programs each pursues are most governed by national space policy. The central theme of this report is policy, and the main purpose is to show the need for comprehensive civilian and military space policies along with the organizational changes required to implement them. The Introduction discusses the complex space policy formulation process. Chapter 1 concentrates on prospects and recommendations for future policies. Chapter 2 looks at the Space Transportation System and institutional issues plaguing NASA and DOD. GRA

N83-32489# Hitachi Ltd., Tokyo (Japan). Dept. of Aeronautics.
INTERPLANETARY MISSION DESIGNS BY MULTIPLE EARTH-VENUS-JUPITER SWINGBYS
Hiroki Yokota and Toru Tanabe *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 65-72 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N83-32490# Hitachi Ltd., Tokyo (Japan).
OPTIMIZATION OF LOW THRUST TRAJECTORIES FOR COLLINEAR LAGRANGE POINT MISSION
Hiroki Matsuo, Yasunori Matogawa, Tatsuhiro Nozue, and Toshio Shimoda *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 87-102 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N83-31705*# Southwestern Univ., Georgetown, Tex. Dept. of Physics.
PRELIMINARY DESIGN OF AN EARTH-BASED DEBRIS DETECTION SYSTEM USING CURRENT TECHNOLOGY AND EXISTING INSTALLATIONS Final Technical Report, 1 Jun. 1982 - 30 Jul. 1983
Thomas H. Morgan May 1983 15 p
(Contract NAS9-16670)
(NASA-CR-171680; NAS 1.26:171680) Avail: NTIS HC A02/MF A01 CSCL 14B

A simple instrument based on present-epoch technology for optical detection of orbital debris is described. The limits of detectability at various altitudes and under different operating conditions for this system are assessed. The kinds of information which can be deduced from this data are examined. Optimal systems for debris detection are discussed. Alternatives and possible improvements from new technologies are also considered. Author

N83-31706# Ballistic Research Labs., Aberdeen Proving Ground, Md.
THE AERODYNAMICS RANGE: A NATIONAL HISTORIC MECHANICAL ENGINEERING LANDMARK Final Report
Edward M. Schmidt May 1983 32 p
(DA Proj. 1L1-61102-AH-43)
(AD-A128042; AD-F300242; ARBRL-SP-00028) Avail: NTIS HC A03/MF A01 CSCL 20/4

On the evening of 21 October 1982, the American Society of Mechanical Engineers (ASME) designated the Aerodynamics Range at the Ballistic Research Laboratory as a National Historic Mechanical Engineering Landmark. The award recognizes the facility as the world's first large-scale, fully instrumented ballistic range capable of producing data on the aerodynamic characteristics of missiles in free flight. This publication describes the Range and examines the associated contributions made to technology. GRA

N83-31707# Range Commanders Council, White Sands Missile Range, N. Mex. Range Safety Group.
FLIGHT TERMINATION SYSTEM EQUIPMENT. VOLUME 4: SAFING AND ARMING DEVICES, INITIATORS, AND SHAPED CHARGES
Mar. 1983 42 p
(AD-A127480; RSG/RCC-317-83-Vol-4) Avail: NTIS HC A03/MF A01 CSCL 19/1

This catalog provides a ready reference to components of flight termination systems used to support range safety functions at various U.S. missile ranges and test facilities. Inclusion in this

catalog does not constitute approval for use of the components on any range. Use of each component must be approved by the Range Commander with in-flight safety responsibility. The information in this catalog is taken from manufacturer's specifications and is provided only as a guide. Nothing is implied as to the relative merits of any one component over another. The minimum specifications cited herein are representative of the individual range requirements. Detailed specification requirements must be obtained from and coordinated with the lead range. A history of flight usage and laboratory tests is included where possible. GRA

N83-31708# Range Commanders Council, White Sands Missile Range, N. Mex. Range Safety Group.
FLIGHT TERMINATION SYSTEM EQUIPMENT. VOLUME 3: RELAYS, TIMERS, AND SWITCHES
Mar. 1983 44 p
(AD-A127479; RSG/RCC-317-83-Vol-3) Avail: NTIS HC A03/MF A01 CSCL 09/1

This catalog provides a ready reference to components of flight termination systems used to support range safety functions at various U.S. missile ranges and test facilities. Inclusion in this catalog does not constitute approval for use of the component on any range. Use of each component must be approved by th e Range Commander with in-flight safety responsibility. Approval for use of a particular component on one range for a given missile does not constitute automatic approval for use of the same component for other missile/space vehicles on the same range, or on the same missile space/vehicle on other ranges. This information in this catalog is taken from manufactures' specifications and is provided only as a guide. Nothing is implied as to the relative merits of any one component over another. The minimum specifications cited herein are representative of the individual range requirements. Detailed specification requirements must be obtained from and coordinated with the lead range. A history of flight usage and laboratory tests is included, where possible. Author (GRA)

N83-31709# Sandia Labs., Albuquerque, N. Mex.
TONOPAH TEST RANGE CAPABILITIES: TECHNICAL MANUAL
Robert L. Manhart Nov. 1982 67 p
(Contract DE-AC04-76DP-00789)
(DE83-005362; SAND-81-1871) Avail: NTIS HC A04/MF A01

This manual described Tonopah Test Range (TTR), defines its testing capabilities, and outlines the steps necessary to schedule tests on the Range. The Range presents an integrated system for ballistic test vehicle tracking and data acquisition. Multiple radars, optical trackers, telemetry stations, a central computer complex, and combined landing/RF communications systems assure full Range coverage for any type of test. While the overall Range functions as a complete system, it is operationally divided into the Test Measurements, Instrumentation Development, and Range Operations divisions. The primary function of TTR is to support DOE weapons test activities. Management, however, encourages other Government agencies and their contractors to schedule tests on the Range which can make effective use of its capabilities. Information concerning Range use by organizations outside of DOE is presented. Range instrumentation and support facilities are described in detail. DOE

N83-31622# Joint Publications Research Service, Arlington, Va.
STAR CITY ASTRONAUT TRAINING CENTER
Ernest Anisimovich Vaskevich *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 20-29 Transl. into ENGLISH from the book "Zvezdny Gorodok (Novoye v Zhizni, Nauke, Tekhnike: Ser. Kosmonavtika" Moscow, Izd. Znaniye, no. 8, Aug. 1981 p 27-37 and 46-52 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

N83-31623# Joint Publications Research Service, Arlington, Va.
COSMONAUT TRAINING SIMULATORS AT ZVEZDNYY GORODOK DESCRIBED
A. Pokrovskiy *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 30-32 Transl. into ENGLISH from Pravda (Moscow), 12 Apr. 1983 p 3 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

N83-31626# Joint Publications Research Service, Arlington, Va.
FLIGHT CONTROL CENTER'S HISTORY, FUNCTIONS SPOTLIGHTED
M. Rebrov *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 40-44 Transl. into ENGLISH from Krasnaya Zvezda (Moscow), 25 Mar. 1983 p 4 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N83-31710# National Oceanic and Atmospheric Administration, Washington, D. C. Office of Satellite Data Processing and Distribution.
THE GOES USER'S GUIDE
J. Dane Clark, comp. Jun. 1983 164 p
Avail: NTIS HC A08/MF A01

General details of the spacecraft and instrumentation carried on board are given, as well as an explanation of the collection and distribution of data to users. Types of images and data available are presented and detailed instructions for obtaining such data are outlined. Author

N83-31618# Joint Publications Research Service, Arlington, Va.
ZAYTSEV COMMENTS ON MODULAR ORBITAL STATIONS
Yu. Zaytsev *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 1 Transl. into ENGLISH from Sov. Estoniya (Tallinn), 12 Apr. 1983 p 4 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

N83-31624# Joint Publications Research Service, Arlington, Va.
COMMENTARY ON ASTRON SATELLITE
V. Gubarev *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 34-36 Transl. into ENGLISH from Pravda (Moscow), 24 Mar. 1983 p 6 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

N83-32491# Institute of Space and Astronautical Science, Tokyo (Japan).
ATTITUDE CONTROL EXPERIMENT OF SOUNDING ROCKET S-520-5
I. Nakatani *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 103-108 ref (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N83-31711*# National Aeronautics and Space Administration, Washington, D. C.
SPACE TRANSPORTATION SYSTEM MISSION STS-7
5 Aug. 1983 5 p refs
(NASA-TM-85337; M-989-03-07; NAS 1.15:85337) Avail: NTIS HC A02/MF A01 CSCL 22A

The second flight of Challenger was another exceptional flight in that 11 major objectives were accomplished. The TELESAT-F

and PALAPA-B1 were deployed exactly on time. The SPAS-01 attached and detached operations went extremely well despite some heating problems with the SPAS. The OSTA-2 experiments for the Material Experiments Assembly and Material Wissenschaftliche Autone Unter Schwerelosigkeit were activated as planned with no indications of anomalies, and the MLR and CFES experiment packages in the middeck area were operated by the crew as planned. Ninety-six percent (56 of 58) of the assigned flight test objectives were completed. The turnaround time was accomplished in the least time to date (only 99.5 hours) and the return to KSC was completed with a total of only 5 days loss of program time. S.L.

N83-31712*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MATERIALS INVESTIGATION OF STS-3 PARACHUTE FAILURE
Ronald L. Nichols Jul. 1983 12 p
(NASA-TM-82540; NAS 1.15:82540) Avail: NTIS HC A02/MF A01 CSCL 22B

Main parachute, No. 2 of SRB A-12 on STS-3, sustained damage during deployment or initial inflation that resulted in its collapse and failure to sustain load. During an investigation of the materials from this parachute, optical and scanning electron microscope analyses were conducted. This examination identified stains and abrasions on vent lines that appear to have been a result of friction contact with its flotation bag lanyard. Mechanical testing of the vent band indicated a reduction in strength of 37 percent obviously due to structural overload, heat, and ocean water exposure. It is concluded from this and other available data that entanglement of parachutes No. 1 and No. 2 during deployment caused adequate structural damage to main parachute No. 2 to render it unable to carry load. Author

N83-31631# Joint Publications Research Service, Arlington, Va.
JURIST COMMENTS ON LEGAL QUESTIONS REGARDING US SHUTTLE
A. Rudev *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 93-97 Transl. into ENGLISH from Aviatsiya i Kosmonavtika (Moscow), no. 3, Mar. 1983 p 36-37 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

No abstracts in this category.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-31713*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ANALYSIS OF GAP HEATING DUE TO STEPPED TILES IN THE SHUTTLE THERMAL PROTECTION SYSTEM
D. H. Petley, D. M. Smith, C. L. W. Edwards, and A. B. Carlson Aug. 1983 100 p refs
(NASA-TP-2209; L-15636; NAS 1.60:2209) Avail: NTIS HC A05/MF A01 CSCL 22B

Analytical methods used to investigate entry gap heating in the Shuttle orbiter thermal protection system are described. Analytical results are given for a fuselage lower-surface location and a wing lower-surface location. These are locations where excessive gap heating occurred on the first flight of the Shuttle. The results of a study to determine the effectiveness of a half-height ceramic fiber gap filler in preventing hot-gas flow in the tile gaps are also given. Author

N83-31714*# TRW Space Technology Labs., Los Angeles, Calif.
SPACE STATION NEEDS, ATTRIBUTES AND ARCHITECTURAL OPTIONS STUDY REVIEW REPORT Final Report
5 Apr. 1983 155 p
(Contract NASw-3681)
(NASA-CR-172947; NAS 1.26:172947) Avail: NTIS HC A08/MF A01 CSCL 22B

A manned space station (SS) produces a significant net economic benefit over its cost, as well as providing substantial social and performance benefits. The largest space station benefits arise from the ability of the SS to warehouse parts, orbit replacement units (ORUs) and fuel and thereby increase the Space Transportation System (STS) load factor. Substantial other benefits are made possibly by the basing of a returnable orbital transfer vehicles (ROTV) and the servicing of geosynchronous Earth orbit (GEO) satellites at the SS. It is recommended that a manned space station be placed in a 28.5 degree inclination orbit in 1990. This SS can be designed to grow, to be maintained and to incorporate new technology as it becomes available. It should be augmented with unmanned space platforms at both 28.5 degree and polar inclinations. These platforms are designed to have very high commonality with the SS resource models. Author

N83-31715*# TRW Space Technology Labs., Los Angeles, Calif.
SPACE STATION NEEDS, ATTRIBUTES AND ARCHITECTURAL OPTIONS STUDY COMMERCIALIZATION WORKING GROUP BRIEFING Final Report
7 Apr. 1983 155 p
(Contract NASw-3681)
(NASA-CR-172948; NAS 1.26:172948) Avail: NTIS HC A08/MF A01 CSCL 22B

The benefits for each of the following commercial areas was investigated: communications, remote sensing, materials processing in space, low Earth orbit (LEO) satellite assembly, testing, and servicing, and space tourism. In each case, where economic benefits are derived, the costs for accomplishing tasks with the Space Station are compared with the cost with the Space Transportation System only. B.G.

N83-31716*# TRW Space Technology Labs., Los Angeles, Calif.
SPACE STATION NEEDS, ATTRIBUTES AND ARCHITECTURE OPTIONS STUDY TECHNOLOGY DEVELOPMENT WORKING GROUP BRIEFING Final Report
7 Apr. 1983 81 p
(Contract NASw-3681)
(NASA-CR-172949; NAS 1.26:172949) Avail: NTIS HC A05/MF A01 CSCL 22B

The structural criteria for a space station is lack of risk by the technology employed. Orbiter technology can be transferred for use in construction with improvement in three areas: fiber optic data bus, water reclamation, and; improved space suit design. B.G.

N83-31717*# TRW Space Technology Labs., Los Angeles, Calif.
SPACE STATION NEEDS, ATTRIBUTES AND ARCHITECTURAL OPTIONS STUDY COSTING WORKING GROUP BRIEFING Final Report
7 Apr. 1983 97 p
(Contract NASw-3681)
(NASA-CR-172950; NAS 1.26:172950) Avail: NTIS

HC A05/MF A01 CSCL 22B

The interface between tasks and the sequence of information flow are charted. The mission model and the requirements of each mission. These requirements along with the mission model schedule resulted in a further definition of the mission payloads, the Space Station architecture and the STS requirements was developed in task 2. The information was used to estimate the cost parameters necessary to generate cost estimates for the system with the aid of cost models for the Missions, Space Station and Space Transportation. E.A.K.

N83-31718*# TRW Space Technology Labs., Los Angeles, Calif.
SPACE STATION NEEDS, ATTRIBUTES AND ARCHITECTURAL OPTIONS STUDY MISSION REQUIREMENT WORKING GROUP BRIEFING Final Report
8 Apr. 1983 137 p
(Contract NASw-3681)
(NASA-CR-172951; NAS 1.26:172951) Avail: NTIS HC A07/MF A01 CSCL 22B

Requirements sources, requirements flow, orbit selection mission model, key missions, integrated, phased requirements, and mission benefits are addressed. Author

N83-31719*# TRW Space Technology Labs., Los Angeles, Calif.
SPACE STATION NEEDS, ATTRIBUTES AND ARCHITECTURAL OPTIONS STUDY SYSTEM WORKING GROUP BRIEFING Final Report
8 Apr. 1983 155 p
(Contract NASw-3681)
(NASA-CR-172952; NAS 1.26:172952) Avail: NTIS HC A08/MF A01 CSCL 22B

Space Transportation System assumptions, trades, manifesting, buildup, characteristics, and ground operations are discussed. Author

N83-31720# Naval Research Lab., Washington, D. C. Advanced Systems Branch.
ACTUATOR-PLACEMENT CONSIDERATIONS FOR THE CONTROL OF LARGE SPACE STRUCTURES Final Report
Robert E. Lindberg, Jr. 11 May 1983 59 p refs
(RR0140241)
(AD-A128241; NRL-8675) Avail: NTIS HC A04/MF A01 CSCL 22/1

Actuator placement for the control of distributed-parameter systems such as large flexible space structures is considered in detail. The first focus is on the degree of controllability as defined in a previous work. Its behavior and approximation is considered via simple problems for which the exact value may be computed. The upper-bound approximation is found to be periodically exact for harmonic systems and acceptable for lightly damped systems. A method is proposed for avoiding the unacceptable behavior of the approximation when a problem has nearly repeated roots. Because the upper-bound approximation in the problem of a double-integral plant diverges, a new lower-bound approximation is developed based on discretization of the continuous-time system. The approximate degree of controllability in three forms (for time-optimal, energy-optimal, or fuel-optimal control policy) is applied to the problem of optimal actuator placement for control of transverse oscillation of a simply supported beam. Both predictable and unanticipated optimal solutions are encountered. The concept of a degree of control spillover is then developed, motivated by the limited fidelity inherent in structural models. A composite criterion incorporating both degree of controllability and degree of control spillover is again applied to the simply-supported-beam problem. Design freedom involving number and placement of actuators is next examined for the computationally simple Independent Modal Space Control (IMSC) design method. Actuator placement is then of prime importance in physically realizing the optimal control laws. Methods for actuator-placement optimization are developed for use with ISMC. GRA

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-31721# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
COMBUSTION DYNAMICS IN ROCKETS Annual Report, 1 Oct. 1981 - 30 Sep. 1982
Brady R. Daniel, J. E. Hubbart, J. I. Jagoda, E. W. Price, and R. K. Sigman Nov. 1982 32 p refs
(Contract F49620-82-C-0013; AF Proj. 2308)
(AD-A127129; AFOSR-83-0221TR) Avail: NTIS HC A03/MF A01 CSCL 21/2

Progress is reported on four distinct projects which are administered as a group. The projects are identified as tasks. A summary for each task follows: Task I. In the first phase of this program the previously developed impedance tube setup utilized to determine the dependence of solid propellants pressure coupled response functions and associated gas phase losses upon the aluminum content of the propellant. Tests over the 400-100 Hz frequency range showed that increasing the aluminum content of the propellant increases both the propellant driving and associated gas phase losses. Furthermore, it shifts the frequency at which maximum driving occurs. In the second phase of this task, the modified impedance tube setup has been utilized in the investigation of the characteristics of the velocity coupled response factor. The status of this investigation is summarized in this report. GRA

N83-31722# School of Aerospace Medicine, Brooks AFB, Tex.
DETECTING MONOMETHYLHYDRAZINE ROCKET FUEL VAPORS WITH THE MDA MODEL 3060 AUTOSPOT AUTOMATIC TOXIC GAS DETECTOR Interim Report, 1 Jan. - 31 Dec. 1981
Leonard J. Luskus and Robert B. Wilcox Mar. 1983 18 p refs
(AF Proj. 7930)
(AD-A127512; SAM-TR-83-9) Avail: NTIS HC A02/MF A01 CSCL 07/3

The MDA Model 3060 Autospot Toxic Gas Detector was evaluated to see if it would satisfy the portable real-time leak-detector need for monomethyl-hydrazine (MMH) use, storage, and handling environments. The Autospot, an electro-optical device whose principle of operation is based on spectrophoto-metric reflectance measurement of color produced by reaction of the hydrazines with a chemically impregnated paper strip, was shown satisfactory for interference-free measurement of MMH over the concentration range 0.04-0.7 ppm under field conditions varying from -8C to 50C and 10-80% relative humidity. Accuracy and precision were judged adequate for personal protection. Two other hydrazines of Air Force interest, hydrazine and unsymmetrical-dimethylhydrazine, were shown measurable at ambient temperatures to below threshold limit value (TLV) concentrations with the same accuracy and reliability as MMH. GRA

N83-32487# National Aerospace Lab., Tokyo (Japan).
COMPUTATION OF TWO-DIMENSIONAL, TRANSONIC, CHEMICALLY REACTING NONEQUILIBRIUM FLOW IN A ROCKET

NOZZLE
Kazuhiro Nakahashi *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 51-64 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N83-31723*# San Jose State Univ., Calif.
SYNTHESIS, CHARACTERIZATION AND POLYMERIZATION OF FLUOROCARBON ETHER ELASTOMERS Final Report, 1 Oct. 1980 - 10 Dec. 1982
Timothy S. Chen, C. H. Cheng, and M. Taylor Dec. 1982 48 p refs
(Contract NCC2-81)
(NASA-CR-166487; NAS 1.26:166487) Avail: NTIS HC A03/MF A01 CSCL 11G

An improved procedure for making perfluoralkylethestriazine elastomers, and, more specifically, the synthesis of 2.4- perfluoroalkenlether-6-perfluoroalkylether triazine is reported. Author

N83-31724*# Hughes Aircraft Co., Culver City, Calif. Advanced Technology Lab.
DEVELOPMENT OF PHOSPHORYLATED ADHESIVES
N. Bilow, T. W. Giants, R. K. Jenkins, and P. L. Campbell Jul. 1983 40 p refs
(Contract NAS2-10238)
(NASA-CR-166507; NAS 1.26:166507) Avail: NTIS HC A03/MF A01 CSCL 11A

The synthesis of epoxy prepolymers containing phosphorus was carried out in such a manner as to provide adhesives containing at least 5 percent of this element. The purpose of this was to impart fire retardant properties to the adhesive. The two epoxy derivatives, bis(4-glycidyl-oxyphenyl)phenylphosphine oxide and bis(4-glycidyl-2-methoxyphenyl)phenylphosphonate, and a curing agent, bis(3-aminophenyl)methylphosphine oxide, were used in conjunction with one another and along with conventional epoxy resins and curing agents to bond Tedlar and Polyphenylethersulfone films to Kerimid-glass syntactic foam-filled honeycomb structures. Elevated temperatures are required to cure the epoxy resins with the phosphorus-contaning diamine; however, when Tedlar is being bonded, lower curing temperatures must be used to avoid shrinkage and the concomitant formation of surface defects. Thus, the phosphorus-containing aromatic amine curing agent cannot be used alone, although it is possible to use it in conjunction with an aliphatic amine which would allow lower cure temperatures to be used. The experimental epoxy resins have not provided adhesive bonds quite as strong as those provided by Epon 828 when compared in peel tests, but the differences are not very significant. It should be noted, if optimum properties are to be realized. In any case the fire retardant characteristics of the neat resin systems obtained are quite pronounced, since in most cases the self-extinguishing properties are evident almost instantly when specimens are removed from a flame. Author

N83-31725# Rhode Island Univ., Kingston. Chemical Lab.
GORDON RESEARCH CONFERENCE IN ORGANOMETER CHEMISTRY Final Report
Irving Mador Mar. 1983 16 p refs Conf. held at Andover, N.H., 16-20 Aug. 1982
(Grant AF-AFOSR-0223-82)
(AD-A127055; AFOSR-83-0241TR) Avail: NTIS HC A02/MF A01 CSCL 07/2

The conference encompassed 26 invited talks and 37 poster session presentation. Three papers concerned electron transfer of the Group I elements. Both anions and cations may be solvolyzed. The affinity for oxygen by certain transition metals (Zr,Mo) is an important driving force in organic rearrangement reactions. Breaking into a C-H bond still represents a formidable task, but it can be achieved with certain Ir complexes. The organometallic chemistry of La and of the actinides represents relatively unexplored territory. Organometallics are important in a number of commercial processes, e.g., fatty olefins, hexamethylene diamine. Synthesis of glycol from syn gas is promising, and CO2 may subsititute for CO as a building block. Clusters may range from bare metals, through di and trimers to multiply-bonded species. Tin, in both plus 2 and plus 4 valencies, has a very extensive organometallic chemistry. Author (GRA)

N83-31726# Golder Associates, Inc., Bellevue, Wash.
RELATIONSHIP OF AN IN-SITU TEST FACILITY TO A DEEP GEOLOGIC REPOSITORY FOR HIGH-LEVEL NUCLEAR WASTE, TASK 4 Final Report, Jun. 1981 - Oct. 1982
R. Gates, F. Bauhof, and L. Gonano Mar. 1983 57 p
(DE83-901818; NUREG/CR-2959-813-1165) Avail: NTIS HC A04/MF A01; SOD HC $5.00

An in-situ test facility was proposed for site characterization and design data collection for high level nuclear waste deep geologic repositories. Recommendations on the relationship between an in-situ test facility (exploratory shaft and underground test facility) and the repository were evaluated. Technical and construction issues are addressed in generic terms for an in situ test facility which forms an integral part of the repository. Facility requirements defined and justified include location and size of the test facility, the design, construction and operational features of the exploratory shaft and underground test facilities, and the nature and duration of in situ testing. Media/site specific considerations are also presented. It is recommended that the exploratory shaft allow for adequate characterization of the strata surrounding the repository horizon. DOE

N83-31727# California Univ., Berkeley. Lawrence Berkeley Lab.
HYDROCARBONS FROM PLANTS AND TREES
Melvin Calvin Jul. 1982 35 p refs Presented at the Biomass Substitutes for Liquid Fuels Symp., Campinas, Brazil, 10 Feb. 1982
(Contract DE-AC03-76SF-00098)
(DE83-002228; LBL-14905; CONF-820269-1) Avail: NTIS HC A03/MF A01

The way energy was used in the US in 1980 was examined. A diagram shows the development of energy from its source to its end use. The following are described: the carbon dioxide problem, the greenhouse effect, sugar cane as an energy source, hydrocarbon-producing plants and trees, and isoprenoids from plants and trees. DOE

24 COMPOSITE MATERIALS

Includes laminates.

N83-31728# British Library Lending Div., Boston Spa (England).
CALCULATION OF, AND RESEARCH INTO, THE PARTICULARS OF THE CURRENT OF GUNITING MATERIAL FLOWING THROUGH A LANCE NOZZLE
A. F. Polyanskii, A. A. Shershnev, I. P. Tsibin, M. V. Malakhov, E. Yu. Shkolnikova, and O. P. Provodenko 1983 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 6, 1982 p 130-132
(BLL-M-34993-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Research has proved that magnesial and lime gunite materials have very similar hydrodynamic particulars. When gunite lance nozzle are calculated, allowance must always be made for collisions between particles of the semi-dispersed gas and suspension. The scatter of speeds of movement of the individual fractions in the semi-dispersed gas and suspension depends greatly on the density and dimensions of the particles and the concentration by weight of the gunite material in the current of air. The higher these

parameters are, the less is the scatter of velocities of the individual fractions. Author

N83-31729 British Aerospace Aircraft Group, Kingston-upon-Thames (England). Ground Test Services Dept.
COMPOSITES IN GROUND TEST SERVICES
G. W. J. Clapp Dec. 1982 10 p refs
(BAe-KGT-N-GEN-00999) Copyright. Avail: Issuing Activity

An outline of the requirements of a ground technical service to support carbon fiber composite testing is presented. The areas of interest are the investigation of failures in structural coupons and test specimens, the design of coupon test specimens and the information research concerning the conditions that the structures are likely to experience in service. A block diagram showing the interrelationships of type of study with manufacturing and quality testing programs summarizes the discussion.
Author (ESA)

N83-31730*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STANDARD TESTS FOR TOUGHENED RESIN COMPOSITES, REVISED EDITION
Jul. 1983 38 p refs
(NASA-RP-1092-Rev; L-15317A; NAS 1.61:1092-Rev) Avail: NTIS HC A03/MF A01 CSCL 11D

Several toughened resin systems are evaluated to achieve commonality for certain kinds of tests used to characterize toughened resin composites. Specifications for five tests were standardized; these test standards are described. Author

N83-31731*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
FORMULATION AND CHARACTERIZATION OF EPOXY RESIN COPOLYMER FOR GRAPHITE COMPOSITES
Fred L. Keck [1983] 33 p ref
(Contract NAS2-10130)
(NASA-CR-166501; NAS 1.26:166501) Avail: NTIS HC A03/MF A01 CSCL 11D

Maximum char yield was obtained with a copolymer containing 25% mol fraction DGEBE and 75% mol fraction DGEBA (Epon 828). To achieve the high values (above 40%), a large quantity of catalyst (trimethoxyboroxine) was necessary. Although a graphite laminate 1/8' thick was successfully fabricated, the limited life of the catalyzed epoxy copolymer system precludes commercial application. Char yields of 45% can be achieved with phenolic cured epoxy systems as indicated by data generated under NAS2-10207 contract. A graphite laminate using this type of resin system was fabricated for comparison purposes. The resultant laminate was easier to process and because the graphite prepreg is more stable, the fabrication process could readily be adapted to commercial applications. Author

N83-31732*# Advanced Research and Applications Corp., Sunnyvale, Calif.
STUDY OF FATIGUE DURABILITY OF ADVANCED COMPOSITE MATERIALS UNDER CONDITIONS OF ACCELERATED LOADING
Hsiuan-Ming Shih Sep. 1982 30 p refs
(Contract NAS2-10061)
(NASA-CR-166405; NAS 1.26:166405) Avail: NTIS HC A03/MF A01 CSCL 11D

The effect of temperature on the tension-tension fatigue life of the 2s T300/5208 graphite/epoxy angle-ply laminate system was investigated in an effort to develop an acceptable and reliable method of accelerated loading. Typical S-log10 N curves were determined experimentally at 25 C, 75 C, and 115 C. The time-temperature superposition principle was employed to find the shift factors of uniaxial fatigue strength, and a general linear equation of S-log10 N for shifting purposes was established. The combined techniques of cyclic creep measurements and optical microscopy upon fatigue failure allow some assessment of the possible physical basis of S-log10 N curve shifting. It was concluded that before fatigue failure, the laminates at all test temperatures and stress levels undergo a unique damage mechanism during fatigue loading. As a result of the present investigations, it is concluded that an accelerated loading method is feasible and can be developed. Author

N83-31733*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
FABRICATION OF SLENDER STRUTS FOR DEPLOYABLE ANTENNAS Final Report
R. M. Bluck and R. R. Johnson Apr. 1983 17 p
(Contract NAS1-14887)
(NASA-CR-172164; NAS 1.26:172164; LMSC-D889763) Avail: NTIS HC A02/MF A01 CSCL 11D

A procedure for manufacturing long slender graphite tubing is desired. Such tubing has considerable application in truss supported spacecraft applications. The motivation for the selection of the tubing size developed in this program is for use as struts in a NASA, Langley Research Center truss supported antenna concept. The manufacturing procedure uses the LMSC vertical winding machine. A procedure for fabricating graphite epoxy tubing with an aluminum foil inner and outer wrap was also developed. The aluminum foil provides a vapor barrier, significantly improves the thermal conductivity, and provides an excellent thermal control surface. Author

N83-31734# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
AEROELASTIC PROPERTIES OF STRAIGHT AND FORWARD SWEPT GRAPHITE/EPOXY WINGS M.S. Thesis
Brian Jerome Landsberger Feb. 1983 159 p
(AD-A127014; AFIT-CI-NR-83-11T) Avail: NTIS HC A08/MF A01 CSCL 20/4

The aeroelastic deformation, divergence and flutter behavior of rectangular, graphite/epoxy, cantilevered plate type wings at zero sweep and thirty degrees of forward sweep is investigated for incompressible flow. Since the wings have varying amounts of bending stiffness, torsion stiffness and bending-torsion stiffness coupling, they each have unique aeroelastic properties. A five mode Rayleigh-Ritz formulation is used to calculate the equation of motion. From this equation static deflection, steady airload deflection, divergence velocities, natural frequencies and flutter velocities are calculated. Experimental two dimensional lift and drag curve data and approximations to three dimensional aerodynamics are used to calculate the aerodynamic forces for the steady airload analysis. The Weissinger L-Method for three dimensional aerodynamic forces is used in the divergence analysis. The V-g method is used to make flutter and natural frequency calculations. Tests on a static loading apparatus gave static deflections, while wind tunnel tests gave steady airload deflections for the wings at zero sweep, and divergence and flutter behavior data for all wings at both zero sweep and thirty degrees forward sweep.
GRA

N83-31735# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.
DESIGN TECHNOLOGY OF ADVANCED COMPOSITES Final Report, Apr. 1977 - May 1982
James W. Mar and Paul A. Lagace Nov. 1982 66 p refs
(Contract F33615-77-C-5155; AF Proj. ILIR)
(AD-A127892; AFWAL-TR-82-4178) Avail: NTIS HC A04/MF A01 CSCL 11/4

The results of several investigations dealing with the design technology of advanced composites are reported. Experimental work was conducted on Hercules graphite/epoxy prepreg in two forms: AS1/3501-6 unidirectional tape and A370-5H/3501-6 fabric. The investigations examine damage tolerance of cylinders, shear buckling, unsymmetric laminates, aeroelastic behavior, and several other topics. In addition, the major accomplishments and benefit of this five year program are highlighted. Author (GRA)

N83-31736# Texas Univ., Austin. Dept. of Materials Science and Engineering.
INTERFACE CHARACTER OF ALUMINUM-GRAPHITE METAL MATRIX COMPOSITES Final Technical Report, 1 Dec. 1977 - 30 Nov. 1982
Harris L. Marcus 27 Jan. 1983 142 p refs

(Contract N00014-78-C-0094)
(AD-A127590; UTMSE-83-1) Avail: NTIS HC A07/MF A01 CSCL 11/4

The results of the research on aluminum/graphite interfaces described in this final report can be summarized in terms of the experimental approaches used to probe the metal matrix interfaces. The materials studied included the commercial Al/graphite composites; layered model systems on single crystal and polycrystalline graphite substrates as well as glassy carbon substrates; and discontinuous fiber SiC/Al composites. The I/V characterization of the interface demonstrated that the oxide within the interface plays a major role in the interface strength. If the interface was in a low conductivity state, peel test fractures occurred at the interface, weaving through the oxide. When the interface was switched into an electrically conductive state peel test fractures occurred within the single crystal graphite substrate. The interface strength was directly correlatable with its conductivity state in the Al-delta-Al2O3-(0001) graphite model system. The commercial material measurements were indecisive. GRA

N83-31737# Drexel Univ., Philadelphia, Pa. Dept. of Mechanical Engineering and Mechanics.
FRACTURE BEHAVIOR OF BORON ALUMINUM COMPOSITES AT ROOM AND ELEVATED TEMPERATURES Annual Progress Report, 1 Jun. 1980 - 31 May 1981
Jonathan Awerbuch Oct. 1982 67 p refs
(Grant AF-AFOSR-0079-79; AF Proj. 2307)
(AD-A127492; AFOSR-83-0269TR) Avail: NTIS HC A04/MF A01 CSCL 11/4

This progress report describes the results of research work on the characterization of fracture behavior in boron/aluminum (B/Al) composites. Emphasis has been placed on the correlation between the observed failure modes and the deformation characteristics of center-notched B/Al composties, where particular attention has been given to the proper test procedure and analytical approach employed. The purpose of this work is not merely to generate and furnish quantitative data but also to discuss the appropriate methodology to be employed in characterizing a new composite material system. The investigation focused on the deformation characteristics, crack tip damage growth, fracture strength, notch sensitivity, and the associated characterization methods. Extensive acoustic emission information is reported and an attempt is made to distinguish among major failure mechanisms, and to monitor fatigue damage progression. Considerable care must be taken to distinguish between emission due to new damage growth and emission due to friction. GRA

N83-31738# Dayton Univ., Ohio. Research Inst.
STRUCTURAL ELEMENT TESTING AND REAL BLADE IMPACT TESTING, VOLUME 2 Final Report, Oct. 1977 - Jun. 1980
Robert S. Bertke Wright-Patterson AFB, Ohio AFWAL Jan. 1983 86 p refs
(Contract F33615-77-C-5221; AF Proj. 3066)
(AD-A127957; AFWAL-TR-82-2121-Vol-2; UDR-TR-82-03-Vol-2) Avail: NTIS HC A05/MF A01 CSCL 11/4

This report contains all of the unexpanded strain and strain rate results of an experimental program concerned with performing nonrotating bench impact tests on test specimens ranging from simple cantilevered beams and plates to real fan blades. This study was carried out under Task VI 'Structural Element Tests' which is part of the overall program 'Foreign Object Impact Damage Criteria.' Three types of blade materials, geometries, and sizes were investigated using ice and substitute bird material as the impactors. The fan blades investigated were the J79 using 403 stainless steel material, the F101 blade using 8A1-1Mo-1V (8-1-1) titanium, and the APSI metal matrix blade material of boron/aluminum. GRA

N83-31739# Dayton Univ., Ohio. Research Inst.
IMPROVED MATERIALS FOR COMPOSITE AND ADHESIVE JOINTS Annual Report, 1 Sep. 1981 - 31 Aug. 1982
R. Kim, W. Click, J. Hartness, M. Koenig, M. Rich, and S. Soni Wright-Patterson AFB, Ohio AFWAL Jan. 1983 142 p refs
(Contract F33615-81-C-5056; AF Proj. 2419)
(AD-A128569; AFWAL-TR-82-4182; UDR-TR-82-118) Avail: NTIS HC A07/MF A01 CSCL 11/4

This report presents a summary of the work performed by the University of Dayton Research Institute during the period 1 Sept 1982 through 31 Aug 1982. Research was conducted in the following areas: Processing and Evaluation of Composites, Adhesive Bonded Joints, Interface/Interphase Characterization, and Mechanics of Composites and Adhesive Bonded Joints. GRA

N83-31740# Harry Diamond Labs., Adelphi, Md.
A CATALOG OF FLUIDIC C-FORMAT LAMINATES
James W. Joyce Mar. 1983 47 p refs
(DA Proj. 1L1-61102-AH-44)
(AD-A128549; HDL-SR-83-2) Avail: NTIS HC A03/MF A01 CSCL 20/4

Harry Diamond Laboratories has recently adopted a standard format--designated C format-for fluidic laminates. This format permits optimal flexibility within its 1.3 x 1.3 in. (3.3 x 3.3-cm) area, and produces a vertical stack of horizontally laminated elements to build up fluidic circuits. This report catalogs C-format laminates. These laminates have been initially categorized according to their general functions; within each such category, each individual laminate configuration is then pictured and its specific functions are discussed. Although some 79 laminates are presented herein, this catalog will be expanded on a continuing basis as new configurations are designed, fabricated, and put into general use. Author (GRA)

N83-31741# California Univ., Livermore. Lawrence Livermore Lab.
COMPUTERIZED ULTRASONIC SCANNING BRIDGE FOR DEFECT IMAGING: COMPOSITE MATERIALS
Donald Boyd, William McDonald, and Andrew Simmons 1982 13 p Presented at the Review of Progr. in Quantitative NDE, San Diego, Calif., 1-6 Aug. 1982
(Contract W-7405-eng-48)
(DE83-001539; UCRL-88240; CONF-820820-9) Avail: NTIS HC A02/MF A01

A computerized ultrasonic scanning bridge was developed for the scanning and imaging of defects in structures. The raster scanning pattern is implemented with any pair of the six available axes. The digitized ultrasonic signal is imaged using a Peritek Graphics system. Details of the ultrasonic scanning bridge and imaging system are reviewed. Examples of the evaluation of a graphite epoxy component are reviewed. The scanning of the composite part requires the use of the two angulations axis for the raster scanning. The correlation of the ultrasonic inspection with failure pressure of the graphite epoxy component is presented. DOE

N83-31742# Sandia Labs., Albuquerque, N. Mex.
DENSIFICATION KINETICS OF SHOCK-ACTIVATED NITRIDES
E. K. Beauchamp, R. E. Loehman, R. A. Graham, B. Morosin, and E. L. Venturini 1982 14 p refs Presented at the Conf. on Ceramic Sci. - Emergent Process Methods for High Technol. Ceramics, Raleigh, N.C., 8 Nov. 1982
(Contract DE-AC04-76DP-00789)
(DE83-003008; SAND-82-1483C; CONF-821133-3) Avail: NTIS HC A02/MF A01

Explosive shock treatment of AlN and Si3N4 increases point defect concentrations by more than an order of magnitude and dislocation densities to 10 to the 15th power to 10 to the 16th power/sq m. Large increases in hot press densification rates for shocked AlN can be attributed to the dislocations. Similarity, the rate of the alpha beta crystallographic transition in Si3N4-MgO mixtures is significantly enhanced by shock-induced dislocations and defects. 5 figures. DOE

N83-31641# Katholieke Universiteit te Leuven (Belgium). Dept. Metaalkunde.
METALLIC COMPOSITE MATERIALS AND MICROGRAVITY
L. Froyen and A. Deruyttere *In* ESA Mater. Sci. under Microgravity

Jun. 1983 p 31-36 refs Sponsored by Nationaal Fonds voor Wetenschappelijk Onderzoek (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N83-31743* National Aeronautics and Space Administration. Pasadena Office, Calif.
HYDRODESULFURIZATION OF CHLORINIZED COAL Patent
John J. Kalvinskas (JPL, California Inst. of Tech., Pasadena) and Naresh K. Rohatgi, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 5 Jul. 1983 10 p Filed 30 Oct. 1981 Supersedes N82-12240 (20 - 03, p 0318) Sponsored by NASA
(NASA-Case-NPO-15304-1; US-Patent-4,391,609; US-Patent-Appl-SN-315587; US-Patent-Class-44-1SR; US-Patent-Class-201-17) Avail: US Patent and Trademark Office CSCL 07D

A method of desulfurization is described in which high sulfur coals are desulfurized by low temperature chlorinolysis of coal in liquid media, preferably water, followed by hydrodesulfurization at a temperature above 500 C. The coals are desulfurized to an extent of up to 90% by weight and simultaneously dechlorinated to a chlorine content below 0.1% by weight. The product coals have lower volatiles loss, lower oxygen and nitrogen content and higher fixed carbon than raw coals treated with hydrogen under the same conditions. Heating the chlorinated coal to a temperature above 500 C. in inert gas such as nitrogen results in significantly less desulfurization.
Official Gazette of the U.S. Patent and Trademark Office

N83-31744*# Alabama Univ., Huntsville. School of Mathematical and Natural Sciences.
X-RAY DIFFRACTION ANALYSIS OF Nb-3Ge AND NbGe ALLOYS Final Report
Jack H. Davis and K. W. House Jun. 1983 77 p refs
(Contract NAS8-33548)
(NASA-CR-170831; NAS 1.26:170831) Avail: NTIS HC A05/MF A01 CSCL 07D

Of all the A-15 samples of NbGe alloy examined, DT 094 is unique in that it was at least 99% pure A-15 phase. Also its diffraction peaks were noisy as if there were about a one percent compositional variation on this phase. DT 094, however, was only a large fragment of the drop tube drop, and thus its small sample size may have reduced the intensity, thus enhancing fluctuations enough to explain some of the loss of peak resolution. Author

N83-31745# Northwestern Univ., Evanston, Ill. Dept. of Physics and Astronomy.
ELECTRONICALLY INDUCED PHASE TRANSFORMATIONS Annual Report, 1 Oct. 1981 - 30 Sep. 1982
Arthur J. Freeman 30 Nov. 1982 9 p
(Grant AF-AFOSR-0024-81; AF Proj. 2301)
(AD-A127031; AFOSR-83-0263TR) Avail: NTIS HC A02/MF A01 CSCL 07/4

Our recent development of self-consistent local (spin) density energy band approaches have provided a powerful theoretical/computational tool for determining the electronic structure and properties of complex materials. The importance of charge transfer between constituent atom species has been demonstrated as has its inclusion by means of accurate self-consistent solutions. Some examples of areas in which progress has been achieved include: the high field superconductivity in Chevrel phase compounds; the unusual magnetic and superconducting properties of some C15 compounds including a better understanding of their relationship between the electronic, lattice and superconducting properties of these materials; self-consistent energy band calculations including all electrons and all atoms in the 16 atoms per unit cell of the linear chain transition metal trichalcogenide, TaSe3; and a detailed assessment of theoretical determination of the electron phonon coupling parameter in metals and intermetallic compounds. GRA

N83-31746# Pittsburgh Univ., Pa. Dept. of Chemistry.
CHARACTERIZATION OF INTERNAL SALES BY LASER DESORPTION MASS SPECTROMETRY
David M. Hercules and K. Balasanmugam 4 May 1983 14 p refs Submitted for publication
(Contract N00014-81-K-0408)
(AD-A127916; TR-2) Avail: NTIS HC A02/MF A01 CSCL 07/4

An intermolecular alkyl transfer reaction which leads to an ion-pair was observed for internal salts of different structural classes analyzed by laser mass spectrometry. Ion pair production during this reaction was detectect by both positive and negative ion laser desorption mass spectrometry. Negative ion laser desportion mass spectra of high intensity, complementing information obtained from positive ion laser desorption mass spectra, are comparable to the results from fields desorption mass spectrometry. GRA

N83-31747# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
MONOCHROMATIC HIGH-SPEED PHOTOGRAPHY OF SOLID ROCKET PROPELLANT COMBUSTION M.S. Thesis
Ronald James Edington Mar. 1983 58 p refs
(Contract F04611-83-X-0010)
(AD-A127874) Avail: NTIS HC A04/MF A01 CSCL 21/2

Eight composite solid propellant formulations containing varying diameter and weight percentages of metallic particles were burned in strand from in two different nitrogen purged combustion bombs at a pressure of 500 psi. High-speed cinemotography was used with an argon laser as the primary monochromatic light source. Two illumination approaches were tried, backlighting and frontlighting. Careful examination of the backlighting films revealed that the flame envelopes surrounding the particles could be eliminated, and that the true particle size could be obtained. However, Schlieren effects obscured much of the information which was available on the film. The frontlighting technique eliminated the Schlieren effects and allowed good particle behavioral data to be obtained, but the reflected monochromatic light was not sufficient to allow true particle diameters to be taken. Author (GRA)

N83-31748# Cornell Univ., Ithaca, N. Y.
TIME RESOLVED STUDY OF PRIMARY DECOMPOSITION PROCESS FOR NITRO PARAFFINS AND NITRAMINES Final Report, 10 Jan. 1980 - 1 Sep. 1983
Edward R. Grant 15 Mar. 1983 27 p refs
(Contract DAAG29-80-C-0065)
(AD-A127660; ARO-16950.9-CH) Avail: NTIS HC A03/MF A01 CSCL 07/3

A molecular beam unimolecular fragmentation mass spectrometer has been developed and applied to the study of primary dissociation processes in energetic materials. The experimental approach uses infrared multiphoton excitation to prepare isolated molecules in the beam for dissociation. Visible laser induced multiphoton ionization detects products with time-of-flight, scattering angle and internal quantum state resolution. This report describes the method, spectroscopic results of CH3 and NO2, experimental observations on the primary decomposition dynamics of CH3NO2, and their theoretical interpretation. GRA

N83-31749# Minnesota Univ., Minneapolis. Dept. of Mechanical Engineering.
HYDROGEN AND SULFUR FROM HYDROGEN SULFIDE 2: AMBIENT TEMPERATURE ELECTROLYSIS USING OXIDATION OF HYDROGEN SULFIDE BY AIR AS THE PRIME ENERGY SOURCE Interim Report, 1 Jul. 1982 - 31 Oct. 1984
Edward A. Fletcher 15 Apr. 1983 12 p refs
(Contract N00014-82-K-0523)

(AD-A127488; TR-2) Avail: NTIS HC A02/MF A01 CSCL 07/4

Hydrogen sulfide recovered from the sweetening of fossil fuels or sought as a mineral for its intrinsic value might be converted, in an electrolytic process which uses atmospheric oxygen, into pipeline pressure hydrogen and sulfur. Such a process may be an alternative to the Claus Process, which recovers only sulfur and uses the hydrogen wastefully. It is also suggested that electrolysis provides a mechanism by which other gaseous products, as well as hydrogen, may be brought to pipeline pressures easily.

Author (GRA)

N83-31750# Lehigh Univ., Bethlehem, Pa. Materials Research Center.

COMPOSITION AND ELECTRICAL PROPERTY RELATIONSHIPS IN POLYCRYSTALLINE INORGANIC MATERIALS Final Report, 1 Dec. 1977 - 31 Oct. 1982

Donald M. Smyth 1 Feb. 1983 47 p refs

(Grant AF-AFOSR-3505-78; AF Proj. 2303)

(AD-A127458; AFOSR-83-0279TR) Avail: NTIS HC A03/MF A01 CSCL 07/2

The defect chemistry of compounds whose applicability depends on the types and amounts of ionic and electronic defects was established. The project focused on LiNbO3, a material studied for a variety of electro-optic device applications. The equilibrium electrical conductivity of LiNbO3 single crystals as a function of temperature (900-1100 C), oxygen partial pressure (10 to the minus 15th power 100,000 Pa or 10 to the minus 20th power - 1 atm), Li/Nb ratio (0.92-1.00), and impurity additions (up to 8.9 mole % MgO and 5.7 mole % TiO2) was measured. The conductivity was characterized by an electronic component that varied as P sub O2 to the minus 1/4 power for P sub O2, less than 10 Pa and an ionic contribution tending toward P sub O2 independence at higher P sub O2. Both components increased slightly with increasing Li2O deficiency, but were virtually unaffected by impurity additions. It is found that crystal density increased on reduction proving that oxygen vacancies are not the major product of reduction. A defect model is proposed that involves only electrons, lithium vacancies, and excess niobium defects. It is concluded that LiNbO3 has a very large degree of intrinsic ionic disorder, amounting to several percent above 900 C, and that this controls the defect chemistry except for the most extreme limits of Li2O deficiency or reduction. GRA

N83-31751# Texas Univ., Austin. Dept. of Chemistry.

BIS(BIPYRAZINE)RUTHENIUM(II) COMPLEXES: CHARACTERIZATION, SPECTROSCOPY AND ELECTROCHEMISTRY Interim Report

R. J. Crutchley, A. B. P. Lever, and A. Poggi Dec. 1982 18 p refs Prepared in cooperation with York Univ., Downsview (Toronto) Submitted for publication Sponsored in part by the Natural Sciences and Engineering Research Council of Canada

(Contract N00014-78-C-0592; NR Proj. 051-693)

(AD-A127500; TR-26) Avail: NTIS HC A02/MF A01 CSCL 07/4

Bis(Bipyrazine)ruthenium(II) complexes of general formula cis-Ru(BPZ)2X2n+ are reported where X = C1(-), Br-, Scn-, NO2-, CO32-, oxalate 2-, H2O, OH- and (OH)(H2O)-, ans n = 0, 1, or 2. The complexes are characterized by microanalysis, electronic, vibrational and nmr spectra and conductivity. Electrochemical data are reported and interpreted in terms of the Ru(III)/Ru(II) and BPZ/BPZ- couples. Two principal charge transfer bands in the electronic spectra of these complexes are rationalized in terms of the effective charge on the ruthenium atom as indicated by the electrochemical data and simple ideas on ligand electronegativity. The pK sub a values for the species Ru(BPZ)2(H2O)22+ and Ru(BPZ)2(H2O)OH+ are reported. GRA

N83-31752# Dayton Univ., Ohio. Research Inst.

SPECTROMETER SENSITIVITY INVESTIGATIONS ON THE SPECTROMETRIC OIL ANALYSIS PROGRAM Final Report, 28 Aug. 1981 - 28 Aug. 1982

Wendell E. Rhine, Costandy S. Saba, and Robert E. Kauffman 22 Apr. 1983 180 p refs

(Contract N68335-81-C-4587; WF41460000)

(AD-A127969; NAEC-92-169) Avail: NTIS HC A09/MF A01 CSCL 01/3

An investigation was conducted in order to determine the particle detection capabilities of the A/E35U-3 rotating disk electrode arc/spark emission spectrometer used by the Joint Oil Analysis Program. It was found that the analyses determined with the rotating disk electrode (RDE) spectrometer were particle-size dependent and that the RDE spectrometer cannot quantitatively analyze particles larger than 5-10 micrometers. The reasons for the low particle detection capabilities were examined and found to be related to particle settling rates which limit the rotating disk's capability to transport particles to the source. Particle transport is improved by using viscous matrices, but the source does not possess the energy required to simultaneously vaporize the oil and excite the metal particles present. Therefore, the particle detection capability of the RDE spectrometer is limited by the low particle transport efficiency of its rotating disk and the low energy of its source. In order to improve the particle detection capabilities of the RDE spectrometer, several alternative sample introduction methods were investigated. Of the methods investigated, the ashing techniques offer the most promise for improving the particle detection capabilities of the RDE spectrometer. Author (GRA)

N83-31753# Purdue Univ., Lafayette, Ind. Dept. of Chemistry.

SUPERCOOLED WATER

C. A. Angell Mar. 1983 57 p refs Submitted for publication

(Contract N00014-78-C-0035)

(AD-A127539) Avail: NTIS HC A04/MF A01 CSCL 07/4

In response to an invitation from Annual Reviews of Physical Chemistry, recent progress in defining and unravelling the anomalies of supercooled water and their origin has been reviewed. Some of the most useful new results have come from binary solution studies. The field is presently in an interesting position with many of the most important properties now measured with acceptable precision and several noncomplimentary theories in circulation to explain them. GRA

N83-31754# Air Force Engineering and Services Center, Tyndall AFB, Fla. Engineering and Services Lab.

A STUDY OF FACTORS AFFECTING SOOT FORMATION IN A SWIRL-STABILIZED COMBUSTOR Final Report, 22 Jan. 1980 - 30 Sep. 1982

Richard W. Rice, Daniel D. Berlinrut, and Jeffery C. Jenkins 1 Apr. 1983 34 p refs

(AF Proj. 0100)

(AD-A128255; AFESC/ESL-TR-82-49) Avail: NTIS HC A03/MF A01 CSCL 21/2

The effects of a variety of combustion and sampling variables on soot concentration and particle size distribution were studied using a swirl-stabilized laboratory combustor and an electrical aerosol analyzer (EAA). Tests were conducted over a range of reference velocities (2.5 to 10m/s) and equivalence ratios (0.05 to 0.3) for five gaseous fuels: propane, n-butane, ethylene, propylene, and 1-butene. Soot concentration and size were found to decrease with increases in either gas reference velocity or equivalence ratio. Alkenes produced more and larger soot particles tha alkanes of corresponding carbon number. Sooting tendency increased with increased carbon chain length. Probe placement and sample line length affected soot concentration measurements. Smoke number readings were obtained for comparison with EAA data. Recommendations were made for further work on the topics lightly surveyed in this study and for extensions which could possibly answer important questions raised here concerning soot growth/oxidation phenomena. GRA

N83-31755# Nevada Univ., Reno. School of Mines.

THE VAPOR PRESSURE OF SALT (HCl) WATER SOLUTIONS BELOW 0 DEG C Interim Report, 1 Dec. 1981 - 30 Nov. 1982

Eugene Miller Jan. 1983 33 p refs

(Grant AF-AFOSR-3333-77; AF Proj. 2308)

(AD-A127765; AFOSR-83-0347TR) Avail: NTIS HC A03/MF A01 CSCL 07/4

Vapor-liquid equilibria data are presented for NaCl-HCl-water solutions, HCl mol fraction from 0.03 to 0.22, solution temperatures between 0 and -40C, and NaCl molalities from 0 to near saturation. The system exhibits a minimum boiling pressure with acid composition, similar to the behavior of a pure acid solution. The vapor composition, similar to the behavior of a pure acid solution. The vapor composition variation with liquid composition is much more complex because of the additional degree of freedom of the three-component system. The measurements for this system are completed. GRA

N83-31756# Air Force Office of Scientific Research, Bolling AFB, Washington, D.C.

THE 1983 AFOSR/AFRPL CHEMICAL ROCKET RESEARCH MEETING Interim Report

Leonard H. Caveny and Robert A. Biggers (AFRPL) Feb. 1983 178 p Meeting held in Lancaster, Calif., 28 Feb. - 3 Mar. 1983 (AF Proj. 2308; AF Proj. 2307)

(AD-A127812; AFOSR-83-0351TR) Avail: NTIS HC A09/MF A01 CSCL 21/2

This document contains expanded abstracts from the Air Force basic research program on chemical rocket propulsion. The document contains the agenda for the Chemical Rocket Research Meeting held at Lancaster, CA on 28 February to 3 March 1983. A special section focuses on combustion instability related internal flow and acoustic interactions. Major topics include: energetic material combustion, metal combustion, diagnostics of reacting flow, chemical kinetics, thermal properties, synthesis of new ingredients, combustion stability, acoustic interaction, and plumes. Author (GRA)

N83-31757# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.

PRELIMINARY INVESTIGATION OF ALUMINUM COMBUSTION IN AIR AND STEAM M.S. Thesis

Amos Edward Hallenbeck, Jr. Mar. 1983 124 p refs

(AD-A128566; NPS67-83-001) Avail: NTIS HC A06/MF A01 CSCL 11/6

The goal of the experiment is to understand the role of metal-steam combustion in the explosion of underwater shaped charges. An apparatus was constructed to investigate combustion of aluminum in steam. For background information, aluminum wires (1 mm diameter, 50 mm length) were ignited in air by high current (480 amperes). Tests in air and steam were photographed using 35 mm color slides and 16 mm movies (4300 frames/sec). Two types of diffusion flames associated with the complete wire were observed, one type of diffusion flame has diffuse pale blue radiation centered on the wire, and another type of flame had intense yellow radiation above the wire. Also, radiation from the wires was measured using Photomultiplier Tubes. Ejected aluminum particles exhibit different combustion properties depending on the environment, air of steam. Particles in air attain velocities of 7 to 11 meters/second and exhibit erractic trajectories before burn out. Particles in steam move at slower speed (2 to 4 m/sec); the particles burn out and re-ignite. Author (GRA)

N83-31758# Artec Associates, Inc., Hayward, Calif.

NOISE THERMOMETRY MEASUREMENTS IN COMBUSTION PROCESSES Final Report, 30 Jun. 1981 - 29 Jun. 1982

S. P. Gill, W. I. Shimmin, and J. D. Watson Jan. 1983 57 p refs (Contract F49620-81-C-0084; AF Proj. 2308)

(AD-A127945; ARTEC-13-176; AFOSR-83-0352TR) Avail: NTIS HC A04/MF A01 CSCL 20/13

Experiments are described in which the temperature of combustion gases is measured by directly sensing the thermal noise emissions from the flowing gases. The temperatures measured by the noise thermometer are compared to reference thermocouple readings. Within the limitations of the reference thermocouple and the accuracy of the noise thermometer calibration standards, the temperature determined by direct noise thermometry appears to represent the true gas temperature and is uncomplicated by contaminating sources of electromagnetic noise. GRA

N83-31759# Argonne National Lab., Ill. Chemistry Div.

SPECTROSCOPIC PROPERTIES OF THE F-ELEMENTS IN COMPOUNDS AND SOLUTIONS

W. T. Carnall, J. V. Beitz, H. Crosswhite, K. Rajnak (Kalamazoo Coll., Mich.), and J. B. Mann (Los Alamos Natl. Lab., N. Mex.) 1982 72 p Presented at the NATO Adv. Study Inst. Conf., on the Systematics and the Properties of the Lanthanides, Braulage, West Germany, 11-25 Jul. 1982

(Contract W-31-109-eng-38)

(DE83-007963; CONF-820773-1) Avail: NTIS HC A04/MF A01

In this systematic examination of some of the spectroscopic properties of the f-elements both the trivalent lanthanides and actinides are considered. The status of the energy level calculations in the single crystal matrices and in aqueous solution, are summarized, and the predicted crystal field structure in certain low symmetry sites with that observed are compared. Some interesting structural insights are hereby gained. The state eigenvectors from these calculations are then used in part in reassessing and interpreting the intensities of transitions in aqueous solution via the Judd-Ofelt theory. The parameters of this theory derived from fitting experimental data are compared with those computed from model considerations. Finally, contributions to the interpretation of excited state relaxation processes in aqueous solution are discussed. DOE

N83-31760# Argonne National Lab., Ill.

ADVANCED PRESSURIZED FLUIDIZED-BED COMBUSTION

Walter F. Podolski and James D. McClung (Morgantown Energy Technology Center, W. Va.) 1982 13 p refs Presented at the Intern. Conf. on Combustion of Tomorrow's Fuels, Santa Barbara, Calif., 8 Nov. 1982

(Contract W-31-109-eng-38)

(DE83-007641; CONF-821176-1) Avail: NTIS HC A02/MF A01

The motivation for and driving force behind the development of advanced pressurized fluidized-bed combustion (DFBC) concepts in the areas of process improvements and economics improvements are discussed. Among the former are increased cycle efficiency, improved load following capability, simplified and improved coal feeding techniques, increased sorbent utilizations, and reduced NO sub x emissions. Potential economic improvements are in the areas of lowering capital costs and operating costs as a result of the process-related improvements. Such improvements are based on inherent limitations in the current design of PFBC systems, for example, in upper temperature limitations and processing capacity. Means to circumvent these limitations, primarily comprising development of two classes or types of advanced concepts were proposed. DOE

N83-31761# Sandia Labs., Albuquerque, N. Mex. Reactor Safety Studies Div.

HYDROGEN COMBUSTION RESULTS FROM THE SANDIA INTERMEDIATE-SCALE (VGES) TANK AND THE SANDIA CRITICAL-TUBE-DIAMETER TEST FACILITY

J. C. Cummings, W. B. Benedick, and P. G. Prassinos 1983 20 p refs Presented at the 2nd Intern. Topical Meeting on Nucl. Thermalhydraulics, Santa Barbara, Calif., 1 Jan. 1982

(Contract DE-AC04-76DP-00789)

(DE83-018744; SAND-82-0913C; CONF-830103-16) Avail: NTIS HC A02/MF A01

Sandia National Laboratories is currently involved in several experimental projects to provide data that will help quantify the threat of hydrogen comustion during LWR accidents. One project, which employs several experimental facilities, is the Variable Geometry Experimental System (VGES). The purpose of this paper is to present description of experimental results from two of these facilities: an intermediate-scale burn tank and a critical-tube-diameter test facility. DOE

N83-31762# Rockwell International Corp., Golden, Colo. Energy Systems Group.

FERRITE CATALYST

Koichi Kugimiya and Yukio Terada Feb. 1983 5 p refs Transl. into ENGLISH from Japanese patent no. Sho-52-49993, 1977

(Contract DE-AC04-76DP-03533)
(DE83-0006514; RFP-Trans-357) Avail: NTIS HC A02/MF A01

According to this invention, a catalyst consisting of a spinel-type ferrite and having an apparent density of 3.0 g/cu cm can be produced by sintering a mixture of lamellar alpha-Fe2O3 and other metal oxides. Partly because of the use of a special form of iron oxide, this ferrite catalyst has low density and contains numerous voids. These voids are interconnected to form a complex and maze-like structure. The exhaust gas flows along the paths of this maze. In the process, the NO/sub x/ and CO contents are efficiently decreased. By virtue of this structure, the pressure loss per 1 cm thickness per 1 sq cm cross-sectional area of catalyst is only about 0.001 kgf/sq cm. By comparison, the pressure loss exceeds 0.1 kgf/sq cm in a ferrite prepared by the conventional method. Furthermore, because of the numerous voids, the catalyst of the present invention has a specific surface about 10 times that of the conventional ferrite, based on a simple estimate. Thus the catalytic effect per unit volume of catalyst is expected to be about 10 times as high. DOE

N83-31763# Institute of Gas Technology, Chicago, Ill.
COAL-GASIFICATION RESEARCH STUDIES Quarterly Report, 20 Aug. - 19 Nov. 1982
Feb. 1983 21 p refs
(Contract DE-AC21-82MC-19301)
(DE83-006604; DOE/MC-19301/1) Avail: NTIS HC A02/MF A01

Chemistry and physics of coal gasification are studied. The three areas under investigation are: coal ash behavior in gasification processes, high-pressure fluidization. The coal ash behavior studies attempt to gain a better understanding of low melting ash and ash agglomerate formation in coal gasifiers. In that portion aimed at characterization of ash components, a 2 inch diameter fluidized bed is being used to study the ash formation as a function of temperature, gas composition and carbon conversion. This apparatus was used to study ash formation of a Kentucky No. 9 plus a No. 11 chair in a CO2/steam atmosphere at 1800 F. Design and construction of the penetrometer viscometer to be used in ash viscosity measurements proceded according to schedule with the design being completed and components ordered, most of which were received. DOE

N83-31764# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
HIGH-RESOLUTION ELECTRON-ENERGY-LOSS SPECTROSCOPY AND PHOTOELECTRON-DIFFRACTION STUDIES OF THE GEOMETRIC STRUCTURE OF ADSORBATES ON SINGLE-CRYSTAL METAL SURFACES Ph.D. Thesis - California Univ., Berkeley
Daniel Henry Rosenblatt Nov. 1982 206 p refs
(Contract DE-AC03-76SF-00098)
(DE83-003395; LBL-14774) Avail: NTIS HC A10/MF A01

Two techniques which have made important contributions to the understanding of surface phenomena are high resolution electron energy loss spectroscopy (EELS) and photoelectron diffraction (PD). EELS is capable of directly measuring the vibrational modes of clean and adsorbate covered metal surfaces. The design, construction, and performance of a new EELS spectrometer are described. These results are discussed in terms of possible structures of the O-Cu(001) system. Recommendations for improvements in this EELS spectrometer and guidelines for future spectrometers are given. PD experiments provide accurate quantitative information about the geometry of atoms and molecules adsorbed on metal surfaces. The technique has advantages when used to study disordered overlayers, molecular overlayers, multiple site systems, and adsorbates which are weak electron scatterers. Four experiments were carried out which exploit these advantages. DOE

N83-31765# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Physics.
INFRARED SPECTRA OF CO ADSORBED AT LOW TEMPERATURES ON Ni
H. J. Levinson, R. G. Tobin, and P. L. Richards Sep. 1982 7 p refs Presented at 3rd Intern. Conf. on Vibrations at Surfaces, Pacific Groves, Calif., 1 Sep. 1982
(Contract DE-AC03-76SF-00098)
(DE83-001568; LBL-14556; CONF-820977) Avail: NTIS HC A02/MF A01

At low temperatures (1.5 to 40 K), CO was found to chemisorb into terminal, bridge, and three-fold sites on evaporated Ni films. The chemisorption takes place directly, rather than through a precursor state. At least two distinct terminal sites are occupied at high coverages. After the sample is warmed from 1.5 to 40 K the infrared spectra change dramatically, showing substantial surface diffusion even at these low temperatures. DOE

N83-31766# California Univ., Berkeley. Lawrence Berkeley Lab.
CLASSICAL AND SEMICLASSICAL ASPECTS OF CHEMICAL DYNAMICS Ph.D. Thesis
Stephen Kevin Gray Aug. 1982 173 p refs
(Contract DE-AC03-76SF-00098)
(DE83-0002024; LBL-14718) Avail: NTIS HC A08/MF A01

Tunneling in the unimolecular reactions H2C2 yields HC2H, HNC yields HCN, and H2CO yields H2 + CO is studied with a classical Hamiltonian that allows the reaction coordinate and transverse vibrational modes to be considered directly. A combination of classical perturbation theory and the semiclassical mechanics method allows tunneling probabilities to be obtained, and a statistical theory is used to construct rate constants for these reactions in the tunneling regime. In this fashion, it is found that tunneling may be important, particularly for low excitation energies. Nonadiabatic charge transfer in the reaction Na + 1 yields Na(+) + 1(-) is treated with classical trajectories based on a classical Hamiltonian that is the analogue of a quantum matrix representation. The charge transfer cross section obtained is found to agree reasonably well with the exact quantum results. An approximate semiclassical formula, valid at high energies, is also obtained. DOE

N83-31767# Sandia Labs., Albuquerque, N. Mex.
TURBULENT COMBUSTION RATE IN A SPARK IGNITION ENGINE: SOME COMPARISONS BETWEEN MODEL PREDICTIONS AND EXPERIMENTS
Claus Borgnakke (Michigan Univ.), Jay K. Martin (Michigan Univ.), and Peter O. Witze Oct. 1982 22 p refs Presented at Combustion Inst. Symp. on Western States Sect., Livermore, Calif., 11 Oct. 1982
(Contract DE-AC04-76DP-00789)
(DE83-003205; SAND-82-8798; WSS/CI-82-69; CONF-821035-9)
Avail: NTIS HC A02/MF A01

A computer simulation model of the combustion process in a spark ignition engine is being developed for the investigation of flow field effects. The model is based on a two zone (burned and unburned gases) thermodynamic analysis of the combustion process that includes axisymmetric mean flow, uniform turbulence, and heat transfer. The turbulence is described by an averaged K-epsilon model which gives the bulk values of the turbulent kinetic energy and the dissipation rate in both the burned and unburned zones. Three experimental diagnostics were used in the study: the initial conditions for turbulence intensity necessary for the model were determined by laser Doppler velocimetry measurements made under motored conditions; the flame shape and location were found by laser shadowgraph photography; cylinder pressure measurements were recorded for both the average engine performance over many cycles, and for each individual cycle in which a photograph was taken. Comparisons between measurements and model predictions are presented for variations in engine speed and ignition location. DOE

N83-31768# Fauske and Associates, Inc., Burr Ridge, Ill.
MELT FINGERS AND POOL PENETRATION INTO A MISCIBLE SUBSTRATE
M. Epstein, M. A. Grolmes, and H. K. Fauske Dec. 1982 42 p refs
(Contract DE-AC02-87NE-37253)

(DE83-004511; DOE/NE-37253/T2; FAI-82/31) Avail: NTIS HC A03/MF A01

The melting of a horizontal slab of frozen material placed beneath a pool of warm liquid miscible with the molten phase of the slab was analyzed. The difficulty which arose when attempting to develop an expression (or correlation) for the downward melting rate was the discovery that the needle like jets, or fingers of molten substrate material which penetrate into the overlying pool appear to control the melting process. Based on the assumption that the spacing between melt fingers is determined by Rayleigh-Taylor instability, it is shown herein that the flow within the fingers controls the pool penetration process. The Rayleigh-Taylor theory is also used to give an explanation of the discrepancy in pool penetration rate versus pool temperature data trends that were reported. The differences between pool penetration in miscible and immiscible systems are discussed and recommendations for further experimental research are indicated. DOE

N83-31769# Exxon Research and Engineering Co., Linden, N.J. Advanced Energy Systems Lab.

SHUNT CURRENT CONTROL METHODS IN ELECTROCHEMICAL SYSTEMS APPLICATIONS

P. Grimes and R. Bellows 1983 17 p refs Presented at the Am. Inst. of Chem. Engr. Natl. Symp. Recent Advan. in Electrochem.-Cell Design, Houston, Tex., 27-31 Mar. 1983

(Contract DE-AC04-76DP-00789)

(DE83-004015; SAND-82-7209C; CONF-830308-3) Avail: NTIS HC A02/MF A01

Electrochemical systems with a common electrolyte shared by a group of cells in series have shunt currents. A portion of the current supplied to an electrochemical cell is diverted through the common electrolyte pathways created by the manifold and channel electrolyte feed systems to the individual cells. These shunt currents produce the effects in the electrochemical cell system that are undesirable. Power is consumed, oxidation and reduction reactions occur in the production of the shunt currents, corrosion of the electrodes can take place and the products of an electrochemical reaction can by contaminated with products produced in the shunt current redox reactions. These and other factors have made the shunt current effects a problem in electrochemical systems. This paper discusses the experimental confirmation of theories and application of the shunt current control methods to functioning electrochemical systems. DOE

N83-31770# Rockwell International Corp., Golden, Colo. Energy Systems Group.

CATALYST FOR EXHAUST-GAS PURIFICATION

Kazuhiro Obata and Masaru Yamane Dec. 1982 12 p Transl. into ENGLISH of Japanese Kokai Patent Publication No. Sho 50-26788 (1975) 12 p

(Contract DE-AC04-76DP-03533)

(DE83-005019; RFP-Trans-368) Avail: NTIS HC A02/MF A01

The present invention concerns a catalyst for purifying exhaust gases containing nitrogen oxides. The catalyst is composed of ferrite with a structure fixed by sintering at high temperatures of 900 to 1500 C. 4 tables. DOE

N83-31771# California Univ., Berkeley. Lawrence Berkeley Lab. Mechanical Engineering Dept.

INFLUENCE OF CHAMBER LENGTH AND EQUIVALENCE RATIO ON FLAME PROPAGATION IN A CONSTANT-VOLUME DUCT

W. Steinert (Goettingeen Univ.), D. Dunn-Rankin, and R. F. Sawyer Sep. 1982 40 p refs Presented at the Combustion Inst. Symp. on Western States Sect., Livermore, Calif., 11 Oct. 1982 Sponsored in part by Deutsche Forschungsgemeinschaft

(Contract DE-AC03-76SF-00098)

(DE83-002573; LBL-14965; CONF-821035-6) Avail: NTIS HC A03/MF A01

An investigation of flames propagating in a constant volume duct of square cross-section (38 mm by 38 mm) is reported. Two borosilicate glass windows provide full optical access to the combustion process. A line ignition source creates an approximately two dimensional flame front. The relations among pressure, flame shape, flame speed, and mass consumption rate are examined. The investigation of flame characteristics is made for (1) stoichiometric methane-air flame propagation in ducts of lengths from 30 mm to 150 mm and (2) ethylene-air flames with equivalence ratios from 0.6 to 1.1 propagating in a 150 mm duct. Uncertainties in the experimental approach are investigated and traced to deviations in the flame from its assumed two dimensional shape and to the sensitivity of the flame speed calculation during the flame initiation period to noise in the pressure data. Results point to distinct regions of flame development, labeled cylindrical, planar, and folded. DOE

N83-31772# Los Alamos Scientific Lab., N. Mex.

SINGULAR PERTURBATION APPROACH TO FLAME THEORY WITH CHAIN AND COMPETING REACTIONS

Paul C. Fife and Basil Nicolaenko 1982 26 p refs Presented at the Conf. on Differential Equations, Lecture Notes in Math., Dundee, Scotland, 1 Mar. 1982

(Contract W-7405-eng-36)

(DE83-000642; LA-UR-82-2676; CONF-820397-1) Avail: NTIS HC A03/MF A01

We investigate the structure of laminar flames with two chemical reactions in the limit of high activation energy asymptotics. Depending on the specific reaction network and the other given chemical data, a wide variety of flame configurations are possible. Here we fully explore these possibilities in the case of sequential and competing reaction pairs. Our methods are general enough to extend to most reaction networks with two or three exothermic reactions with high activation energy. DOE

N83-31773# Los Alamos Scientific Lab., N. Mex. Center for Nonlinear Studies.

TRAVELING-WAVE SOLUTIONS TO REACTION-DIFFUSION SYSTEMS MODELING COMBUSTION

Henri Berestycki, Basil Nicolaenko, and Bruno Scheurer 1982 29 p refs Presented at the Am. Math. Soc. Conf. on Partial Differential Equations, Durham, N.H., 1 Jun. 1982

(Contract W-7405-eng-36)

(DE83-000603; LA-UR-82-2832; CONF-8206127-2) Avail: NTIS HC A03/MF A01

The deflagration wave problem for a compressible reacting gas, with species involved in a single step chemical reaction are considered. In the limit of small Mach numbers, the one dimensional traveling wave problem reduces to a system of reaction-diffusion equations. Thermomechanical coefficients are temperature dependent. Existence is proved by first considering the problem in a bounded domain, and taking an infinite domain limit. In the singular limit of high activation energy in the Arrhenium exponential term, strong convergence is proved to a limiting free boundary problem (discontinuity of the derivatives on the free boundary). DOE

N83-31774# Los Alamos Scientific Lab., N. Mex. Center for Nonlinear Studies.

ASYMPTOTIC FLAME THEORY WITH COMPLEX CHEMISTRY

Paul C. Fife and Basil Nicolaenko 1982 30 p refs Presented at the Am. Math. Soc. Conf. on Partial Differential Equations, Durham, N.H., 1 Jun. 1982

(Contract W-7405-eng-36)

(DE83-002077; LA-UR-82-2993; CONF-8206127-1) Avail: NTIS HC A03/MF A01

We investigate the structure of laminar flames with general complex chemistry networks in the limit of high activation energy asymptotics. Depending on the specific reaction network and other given thermomechanical data, a wide variety of flame configurations are possible. Here we present a first version of a systematic asymptotic reduction of complex chemistry networks and give practical criteria to determine the dominant reactions when transport and chemistry are coupled. DOE

N83-31775# Sandia Labs., Albuquerque, N. Mex.

HYDROGEN COMBUSTION IN AQUEOUS FOAMS

M. R. Baer, S. K. Griffiths, and J. E. Shepherd Sep. 1982 70 p refs

(Contract DE-AC04-76DP-00789)
(DE83-002534; NUREG/CR-2865; SAND-82-0917) Avail: NTIS HC A04/MF A01

Water fogs are recognized as an effective means to mitigate the effects of large-scale hydrogen combustion that might accompany some loss-of-coolant nuclear reactor accidents. Fogs of sufficiently high density to produce large beneficial effects may, however, be difficult to generate and maintain. An alternate method of suspending the desired mass of water is via high expansion-ratio aqueous foams. To help assess the usefulness of aqueous foams in a mitigation plan, several open tube tests and over one hundred closed vessel tests of hydrogen/air combustion with and without foam have been conducted. Above 15% hydrogen concentration, the foam causes a significant reduction in the pressure rise. The maximum effect occurs at about 28% hydrogen (the stoichiometric limit is 29.6% hydrogen) where the peak overpressure is reduced by two and one-half. Despite this overall pressure reduction, the flame speed is increased by up to an order of magnitude for combustion in the foam and strong pressure fluctuations are observed near a hydrogen concentration of 23%. DOE

N83-31776# Pacific Northwest Lab., Richland, Wash.
SOLUBILITIES OF ACTINIDE SOLIDS UNDER OXIC CONDITIONS
Dhanpat Rai and R. G. Strickert Sep. 1982 18 p Presented at the Geolog. Soc. of Am. Meeting on Geochem. of Radionuclide Migration-Retardation, New Orleans, 18-20 Oct. 1982
(Contract DE-AC06-76RL-01830)
(DE83-002675; PNL-SA-10368; CONF-8210103-1) Avail: NTIS HC A02/MF A01

The objectives were to characterize actinide solids in wastes and determine their solubility. The solubilities of Pa- and Np-doped glasses and Am(OH)3 were determined under controlled redox conditions. DOE

N83-31777# Oak Ridge National Lab., Tenn. Fuel Recycle Div.
EXTRACTIVE DISTILLATION OF NITRIC ACID USING THE TWO-POT CONCEPT
R. M. Counce, W. S. Groenier, W. D. Holland, R. T. Jubin, E. D. North, L. E. Thompson, Jr., and T. L. Hebble Dec. 1982 33 p refs
(Contract W-7405-eng-26)
(DE83-004176; ORNL/TM-7982) Avail: NTIS HC A03/MF A01

Experiments have confirmed the validity of a design for a nitric acid concentration system for use in shielded nuclear fuel reprocessing plants. Plans for producing the scrub solution for the IODOX process require the concentration and recycle of low strength (< 68.5 wt %) nitric acid sources. The described system utilizes extractive distillation with Mg(NO3)2 as the solvent and features two pots: an extractive distillation pot in which a concentrated acid product is obtained by contacting the acid feed with the solvent and a solvent recovery pot in which the solvent is dehydrated and recovered for recycle. In these experiments, a concentrated product of 89 wt % nitric acid was produced from azeotropic feed. The available vapor-liquid equilibria data for the Mg(NO3)2-HNO3-H2O system was empirically correlated, and a design methodology was developed for the two pot extractive distillation process. DOE

N83-31778# Brookhaven National Lab., Upton, N. Y.
CHARACTERISTICS OF THERMOLUMINESCENCE GLOW CURVES FOR MATERIALS EXHIBITING MORE THAN ONE GLOW PEAK
P. W. Levy 1982 24 p refs Presented at the 3rd Intern. Spec. Seminar on Thermoluminescence and ESR Dating, Elsinore, Denmark, 1 Jul. 1982
(Contracts DE-AC02-76CH-00016; EY-76-02-0016)
(DE83-004602; BNL-32211; CONF-820764-2) Avail: NTIS HC A02/MF A01

The properties of thermoluminescence glow curves, containing one or more glow peaks have been determined for situations where the assumptions invoked to obtain the usual first and second order kinetics do not apply. First order kinetics occurs only when retrapping is negligible. If more than one glow peak is present and retrapping occurs between different types of traps the glow peaks can be approximated, except in the wings, by the usual first and second order expressions; but often physically unrealistic parameters are obtained. These studies indicate that dating is best accomplished with minerals exhibiting first order kinetics. DOE

N83-31779# Ames Lab., Iowa.
KINETICS AND MECHANISMS OF THE REACTIONS OF ALIPHATIC FREE RADICALS WITH ORGANOCOBALOXIMES AND FLUOROPENTAAMMINECOBALT (III) ION AND OF IRON (III) WITH METHYRODOXIME Ph.D. Thesis
Ronnie Charles McHatton Dec. 1982 140 p refs
(Contract W-7405-eng-82)
(DE83-004856; IS-T-1034) Avail: NTIS HC A07/MF A01

Benzyl, methyl, ethyl, and isopropyl(aquo)cobaloximes, RCo (dmgH)2OH2, were shown to undergo highly specific reactions in which a new carbon-carbon bond is formed in their reactions with aliphatic free radicals. Thus, benzylcobaloxime reacts with the C(CH3)2OH radical to yield PhCH2C(CH3)2OH and Co/sup II/(dmgH)2OH2. With the exception of benzyl and meta-chlorophenyl radicals, this reaction appears quite general for aliphatic radicals. The kinetics of the reaction between the organocobaloximes and the C(CH3)2OH and CH(CH3)OC2H5 radicals were determined by novel kinetic competition methods. The organocobaloximes undergo an acid-base equilibrium in which one of the O-H...O groups of the (dmgH)2 pseudo-macrocycle is protonated. Rate constants for the radicals are provided. The data are interpreted in terms of an addition-elimination mechanism involving one of the dimethylglyoxime ligands of the organocobaloxime. DOE

N83-31780# Ames Lab., Iowa.
KINETICS OF THE REDUCTION OF CALCIUM SULFATE WITH CARBON MONOXIDE AND HYDROGEN M.S. Thesis
Luis Manuel Biaz-Bossio Jul. 1982 113 p refs
(Contract W-7405-eng-82)
(DE83-004963; IS-T-1007) Avail: NTIS HC A06/MF A01

The reductive decomposition of calcium sulfate pellets with both hydrogen and carbon monoxide was studied experimentally in the range of 900 to 1100 C. The conditions of the reaction were controlled in order to enhance the formation of calcium oxide while the production of the undesirable calcium sulfide was inhibied; carbon dioxide was used to prevent calcium sulfide formation. Cylindrical calcium sulfate pellets were prepared at a constant compression pressure and reduction was carried out initially at a constant temperature and various reductant gas concentrations. Additional experiments were made with a constant gas phase concentration and various reaction temperatures. Stabilization of the pellet through heating prior to initiating the reduction process was required in order to obtain reliable data. Treatment of the pellet at elevated temperatures caused sintering which reduced the pellet surface area to a value that changed little with additional heating time. Conversions of about 100% were obtained in several hours with both reductant gases at temperatures around 1000 C and higher. DOE

N83-31781# California Univ., Livermore. Lawrence Livermore Lab. Dept. of Engineering-Applied Science.
DEVELOPMENT OF DATA-ACQUISITION-AND-ANALYSIS SYSTEMS FOR IN-BEAM GAMMA-RAY SPECTROSCOPY: A STUDY OF THE NUCLEUS 180W Ph.D. Thesis
Joseph Bror Carlson 1982 191 p refs
(Contract W-7405-eng-48)
(DE83-004992; UCRL-53364) Avail: NTIS HC A09/MF A01

The design and development of state of the art computer based data acquisition and analysis systems for use in nuclear structure research is presented. The applicability and usefulness of these systems for these research tasks was illustrated by performing and analyzing experiments to study the nucleus W180.

These experimental results and a brief comparison with a statistical model calculation are presented. DOE

N83-31782# California Univ., Berkeley. Lawrence Berkeley Lab.
DESIGN PHILOSOPHY FOR HIGH-RESOLUTION RATE AND THROUGHPUT SPECTROSCOPY SYSTEMS
F. S. Goulding, D. A. Landis, and N. W. Madden May 1982 11 p refs Presented at the IEEE Nucl. Sci. Symp., Washington, 20 Oct. 1982
(Contract DE-AC03-76SF-00098)
(DE83-004117; LBL-14464; CONF-821011-29) Avail: NTIS HC A02/MF A01

The philosophy behind the design of a pulse processing system used in a semiconductor detector X-ray spectrometer to be used for plasma diagnostics is described. This application presents the unusual problems of very high counting rates and a high-energy neutron background while still requiring excellent resolution. To meet these requirements three specific new advances are included in the design: (1) A symmetrical triangular pulse shape is employed in the main pulse-processing channel. (2) To cope with the very wide dynamic range of signals while maintaining a constant fast resolving time, approximately symmetrical triangular pulse shaping is also used in the fast pulse pile-up inspection channel. (3) The demand for high throughput has resulted in a reexamination of the operation of pile-up rejectors and pulse stretchers. DOE

N83-31783# Ohio State Univ., Columbus. Dept. of Chemical Engineering.
ANALYSIS OF GAS PURIFICATION BY HEATLESS ADSORPTION
K. S. Knaebel and F. B. Hill 1982 29 p refs Presented at Ann. Meeting of Heat Transfer and Energy Conversion, Los Angeles, 14 Nov. 1982
(DE83-003965; BNL-32132; CONF-821106-22) Avail: NTIS HC A03/MF A01

The heatless adsorption process was analyzed as a process for the purification of the light component of a binary feed of arbitrary composition. Local equilibrium with liner, uncoupled isotherms was asssumed. The results of the analysis showed that a critical pressure ratio increases as the light component content of the feed decreases. When clean-up of the light component is complete, pressurization with product leads to higher light component recoveries than pressurization with feed. This difference becomes large at small separation factors, small light-component feed contents, and large pressure ratios. DOE

N83-31784# Pacific Northwest Lab., Richland, Wash.
USE OF ANALYTICAL ELECTRON MICROSCOPY AND AUGER ELECTRON SPECTROSCOPY FOR EVALUATING MATERIALS
R. H. Jones, S. M. Bruemmer, M. T. Thomas, and D. R. Baer Nov. 1982 6 p refs Presented at Am. Nucl. Soc. Winter Meeting, Washington, D.C., 14 Nov. 1982
(Contract DE-AC06-76RL-01830)
(DE83-003658; PNL-SA-10560) Avail: NTIS HC A02/MF A01

Analytical electron microscopy (AEM) can be used to characterize the microstructure and microchemistry of materials over dimensions less than 10 nm while Auger electron spectroscopy (AES) can be used to characterize the chemical composition of surfaces and interfaces to a depth of less than 1 nm. Frequently, the information gained from both instruments can be coupled to give new insight into the behavior of materials. Examples of the use of AEM and AES to characterize segregation, sensitization and radiation damage are presented. A short description of the AEM and AES techniques are given. DOE

N83-31785# Ames Lab., Iowa. Dept. of Chemistry.
HYDROGENATION OF CARBON MONOXIDE OVER RUTHENIUM-RHENIUM ON ALUMINA CATALYSTS M.S. Thesis
David Ellwood Whitmoyer Jul. 1982 78 p refs
(Contract W-7405-eng-82)
(DE83-004975; IS-T-1006) Avail: NTIS HC A05/MF A01

Ru/Al2O3, Re/Al2O3 and Ru-Re/Al2O3 catalysts were synthesized and characterized. A kinetics study was conducted for the methanation reaction on each of these catalysts using a Berty reactor. Operating conditions for kinetic experiments were 200 to 260 C and 35 to 40 atm. Hydrocarbon products were detected by a gas chromatograph. It was found that the Ru/Al2O3 and Re/Al2O3 gave similar activation energies. The Ru-Re/Al2O3 catalyst gave a significantly higher activation energy. Kinetic orders with respect to carbon monoxide and hydrogen were determined. Two mechanisms were proposed, one for the Ru/Al2O3 and Re/Al2O3 catalysts and one for the Ru-Re/Al2O3 catalyst from which the experimentally observed reaction orders was derived. An Auger electron spectroscopy study was conducted on a 50:50 atom percent ruthenium-rhenium alloy to determine surface segregation. No surface segregation was observed even after heating the alloy for two weeks at 1050 C. DOE

N83-31786# Georgia Inst. of Tech., Atlanta.
ANAEROBIC TREATMENT OF GASIFIED EFFLUENTS Quarterly Report
Wendell H. Cross, Edward S. K. Chian, Frederick G. Pohland, Maurizio Giabbai, Stephen R. Harper, Sheng S. Cheng, and Furun Lu Sep. 1982 11 p
(Contract DE-AC18-81FC-10297)
(DE83-001864; DOE/FC-10297/T4; QR-5) Avail: NTIS HC A02/MF A01

This report summarizes the work performed during the period from July 1, 1982 through September 30, 1982 on the DOE research program on Anaerobic Treatment of Gasifier Effluents (Contract No. CE-AC18-81FC10297). The major efforts have been directed toward reacclimation of two of the anaerobic treatment systems, continued steady state operation of the third system at an approximately 10% raw wastewater loading and operation of a nitrification system on full strength effluent from the third anaerobic treatment system. The progress of these efforts is depicted along with project expenditures for the above contract. DOE

N83-31787# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
ELECTROCATALYSIS ON ION-IMPLANTED ELECTRODES
W. E. OGrady and G. K. Wolf (Heidelburg Univ., West Germany) 1981 18 p refs Presented at Symp. on Electrocatalysis, Minneapolis, 10 May 1981
(Contract DE-AC02-76CH-00016)
(DE82-015768; BNL-30243; CONF-8105105-5) Avail: NTIS HC A02/MF A01

The oxidation of formic acid and methanol has been studied on electrodes prepared by ion implanting Pt in RuO2. Formic acid was found to oxidize readily on this catalyst without poisoning the surface. In the case of methanol no reaction was found to take place. Using XPS techniques, Pt was shown to have a lower binding energy than bulk Pt. This suggests that there is excess charge on this form of Pt which changes its reactivity. DOE

N83-31788# Ames Lab., Iowa.
ABSORPTION OF ETHANOL AND WATER VAPOR BY SILICALITE, A HYDROPHOBIC MOLECULAR SIEVE M.S. Thesis
Stephen Matthew Klein Jul. 1982 69 p refs
(Contract W-7405-eng-82)
(DE83-004981; IS-T-1020) Avail: NTIS HC A04/MF A01

The molecular sieve Silicalite, which is known to selectively adsorb organic molecules from aqueous solutions, was studied to determine its capacity to adsorb mixtures of ethanol and water vapor. Measurements were made of the weight adsorbed from these vapors at isothermal, equilibrium conditions and at different pressures and temperatures. The mass of vapor adsorbed is only dependent on the partial pressure of ethanol in the ethanol/water vapor, provided that the vapor is at least 27 mole % ethanol. Silicalite would be very selective for ethanol over water. Adsorption of ethanol/water mixtures by a small sample of Silicalite was noticeably greater than adsorption by a larger bed of the same material, indicating that equilibrium in a larger bed is difficult to achieve because of resistance to mass transfer in the adsorbent micropores when water is initially adsorbed. DOE

N83-31789# National Bureau of Standards, Washington, D.C. Materials Chemistry Div.
ADVANCES IN THE SEC (SIZE EXCLUSION CHROMATOGRAPHY) CHARACTERIZATION OF ORGANOMETALLIC COPOLYMERS AND COPOLYMERIZATION: DESORPTION OF CHARGED SPECIES BY INJECTED DILUTE ACETIC ACID
E. J. Parks, R. B. Johannesen, and F. E. Brinckman Sep. 1982 32 p refs Sponsored in part by Naval Ship Research and Development Center, Annapolis, Md.
(PB83-178681; NBSIR-82-2577) Avail: NTIS HC A03/MF A01 CSCL 07D

The chemical characterization of controlled-release, biocidal triorganotin-containing copolymers (organometallic polymers, OMPs) is necessary for predicting the in-service performance of these important materials. An OMP investigated in the present research was prepared by the free radial copolymerization of tributyltin methacrylate (TBTM) and methylmethacrylate (MMA). Size exclusion chromatography (SEC) on muStyragel, coupled with an in-line graphite furnace atomic absorption detector (GFAA) quantitates the bioactive tin in at least two well-resolved fractions: a polymer fraction, and, probably, unreacted TBTM. However, THF slowly elutes a third component, now believed to be an adsorbed ionic tin-containing compound. Author (GRA)

N83-31790# Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway). Dept. of Science and Technology.
NUMERICAL SIMULATION OF TURBULENT FLAME AND PRESSURE DEVELOPMENT IN GAS EXPLOSIONS
Bjoern H. Hjertager Dec. 1981 23 p refs
(PB83-177832; CMI-813403-1) Avail: NTIS HC A02/MF A01 CSCL 19D

Numerical modeling of turbulent flame acceleration in gas explosions is discussed. Applications of the modeling technique are shown for pressure development in the presence of obstacles and turbulent jet ignition. GRA

N83-31791# Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway).
LARGE-SCALE EXPERIMENTS ON TURBULENT FLAME AND PRESSURE DEVELOPMENT
Bjoern H. Hjertager Dec. 1981 20 p refs
(PB83-177840; CMI-813403-3) Avail: NTIS HC A02/MF A01 CSCL 19D

Turbulent flame and pressure development in partly confined systems and thus enable improved prediction of pressure loads in various geometries encountered in practice were investigated. A description of the large scale experimental facilities used and an overview of the experimental results obtained so far, are given. GRA

N83-31792# Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway). Dept. of Science and Technology.
ELECTRIC SPARK SENSITIVITY PROFILE OF EXPLOSIBLE/COMBUSTIBLE SYSTEMS
Rolf K. Eckhoff Jun. 1982 9 p refs Sponsored in part by Royal Norwegian Council for Scientific and Industrial Research
(PB83-177865; CMI-823350-3) Avail: NTIS HC A02/MF A01 CSCL 19D

A new approach to the characterization of the electric spark ignition sensitivity of explosible/combustible systems (gas mixtures, mists and sprays, dust clouds and dust layers, hybrid systems) implying the measurement of E(min) as a function of the spark duration is proposed. GRA

N83-31793# Oklahoma State Univ., Stillwater. Dept. of Biochemistry.
BIOCHEMICAL ANALYSES FOR DETECTION AND ASSESSMENT OF POLLUTION IN THE SUBSURFACE ENVIRONMENT Final Report
Jenq C. Chang, Andrea B. Arquitt, Rosalee Merz, Elizabeth R. Doyel, Phyllis T. Norton, Laura B. Frazier, Jerri Z. Jackson, Joann J. Webster, Jeffrey L. Howard, Otis C. Dermer et al Mar. 1983 143 p refs
(Grant EPA-R-804613)
(PB83-182303; EPA-600/2-83-021) Avail: NTIS HC A07/MF A01 CSCL 07D

Selected biochemical analysis techniques were investigated for potential use in detecting and assessing pollution of subsurface environments. Procedures for determining protein, nucleic acids, organic phosphate, lipopolysaccharides, and various coenzymes and enzyme systems were evaluated. These proedures were modified and adapted for application to environmental samples, and sensitivities were determined in terms of numbers of Escherichia coil cells which could be detected. Author (GRA)

N83-31794# Council for Scientific and Industrial Research, Pretoria (South Africa). Chemical Engineering Research Group.
ELECTROCHEMICAL MASS TRANSFER TO PARALLEL PLATES WITH AND WITHOUT TURBULENCE PROMOTERS: SIMULATION OF PLATE HEAT EXCHANGER CONFIGURATIONS M.S. Thesis
W. W. Focke May 1982 140 p refs In ENGLISH; AFRIKAANS summary
(PB83-183145; CSIR-CENG-421; ISBN-0-7988-2346-1) Avail: NTIS HC A07/MF A01 CSCL 07D

The electrochemical diffusion limited current technique (DLCT) was used to model constant wall temperature heat transfer to parallel plates. The method is suitable for measuring local transfer rates which reveal the flow structure close to the wall. By analogy the mass transfer results are applicable to transfer as well. Average mass transfer rates were measured with fully as well as partially active electrodes in a rectangular duct of low aspect ratio. Mass transfer in the turbulent range suggests a square foot dependence of Stanton on the friction factor. This contrasts with the linear dependence predicted by the Chilton-Colburn analogy. An idealized model based on this assumption and making use of results obtained for turbulent transfer to a flat plate in an infinite medium predicts a relationship in approximate agreement with the experimental correlation given above. The experimental results for fully turbulent flow also correlate well according to the mass transfer similarity law indicating that the mass transfer coefficient is determined by the hydrodynamic situation prevailing at the wall. Author (GRA)

N83-31665# Tokyo Univ. (Japan). Dept. of Aeronautics.
COMBUSTION EXPERIMENTS UNDER MICROGRAVITY
S. Kumagai *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 177-182 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31666*# California Univ., San Diego.
FUNDAMENTAL COMBUSTION EXPERIMENTS IN MICROGRAVITY
A. L. Berlad *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 183-190 refs Sponsored by NASA (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31667# Princeton Univ., N. J. Dept. of Mechanical and Aerospace Engineering.
STUDIES OF EXPERIMENTS ON DROPLET BURNING AT REDUCED GRAVITY
F. A. Williams *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 191-196 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31695# Commissariat a l'Energie Atomique, Saclay (France).
CRITICAL POINT PHENOMENA IN FLUIDS
D. Beysens *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 367-376 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31697# Ruhr Univ., Bochum (West Germany). Inst. fuer Physikalische Chemie 2.
ADSORPTION BEHAVIOR OF PURE FLUIDS NEAR THE GAS-LIQUID CRITICAL POINT
G. H. Findenegg *In* ESA Mater. Sci. under Microgravity Jun.

1983 p 385-391 refs (For primary document see N83-31637 20-12)
(Contract BMFT-01-QV-070-ZA/SN)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31698# Central Electricity Research Labs., Leatherhead (England).
ELECTROLYTE SOLUTIONS NEAR THE CRITICAL POINT OF WATER: A REVIEW AND PROPOSAL FOR STUDIES UNDER MICROGRAVITY CONDITIONS
D. J. Turner *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 393-400 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31699# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Advanced Program Div.
THERMAL CONDUCTIVITY MEASUREMENT ON FLUIDS UNDER MICROGRAVITY USING HOLOGRAPHIC INTERFEROMETRY
K. Wanders, G. Goerler, and H. Steinbichler (Steinbichler Lab.) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 403-408 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-32484# Nagoya Univ. (Japan). Dept. of Aeronautical Engineering.
OXYHYDROGEN IGNITION AND FLAME PROPAGATION UNDER CRYOGENIC TEMPERATURES
A. Koichi Hayashi and T. Fujiwara *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 27-31 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32501# Tokyo Inst. of Tech. (Japan). Research Lab. for Nuclear Reactors.
RAREFACTION PHENOMENA IN GAS ANS ISOTOPE SEPARATION
Hisashi Mikami *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 1-7 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N83-31795* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SILICON-SLURRY/ALUMINIDE COATING Patent
Daniel L. Deadmore and Stanley G. Young, inventors (to NASA) Issued 15 Feb. 1983 6 p Filed 14 Aug. 1981
(NASA-Case-13343-2; US-Patent-4,374,183;
US-Patent-Appl-SN-293418; US-Patent-Class-428-641;
US-Patent-Class-428-650; US-Patent-Class-428-680;
US-Patent-Class-428-450; US-Patent-Class-428-469;
US-Patent-Class-427-318; US-Patent-Class-427-419.2) Avail: US Patent and Trademark Office CSCL 11F

A low cost coating protects metallic base system substrates from high temperatures, high gas velocity ovidation, thermal fatigue and hot corrosion and is particularly useful fo protecting vanes and blades in aircraft and land based gas turbine engines. A lacquer slurry comprising cellulose nitrate containing high purity silicon powder is sprayed onto the superalloy substrates. The silicon layer is then aluminized to complete the coating. The Si-Al coating is less costly to produce than advanced aluminides and protects the substrates from oxidation and thermal fatigue for a much longer period of time than the conventional aluminide coatings. While more expensive Pt-Al coatings and physical vapor deposited MCrAlY coatings may last longer or provide equal protection on certain substrates, the Si-Al coating exceeded the performance of both types of coatings on certain superalloys in high gas velocity oxidation and thermal fatigue and increased the resistance of certain superalloys to hot corrosion.
Official Gazette of the U.S. Patent and Trademark Office

N83-31796# British Library Lending Div., Boston Spa (England).
MARTENSITE STRUCTURE AFTER THERMAL-MAGNETIC AND THERMAL-MECHANICAL-MAGNETIC TREATMENT
M. L. Bernshtein, L. M. Kaputkina, S. D. Prokoshkin, and A. I. Shalimova 1983 10 p refs Transl. into ENGLISH from Izv. (USSR), p 106-111
(BLL-M-34939-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Research showed that quenching in a magnetic field increases the amount of martensite in 120Kh6 steel. Applying a direct magnetic field of 1.6 x 10 to the 6th A/m reduces the martensite grain size, and makes the grain size more homogeneous, in 120Kh6, 60N20 and 80Kh5 steels when the grains are formed from undeformed and hot deformed austenite; in the 80Kh5 steel the proportion of twinned crystals is also reduced. When the 80Kh5 steel is cooled in a magnetic field, the degree of two-phase decomposition, during self-tempering, in a magnetic field, of the martensite formed from undeformed and hot deformed austenite increases, while the two-phase decomposition is retarded during subsequent tempering at a low temperature. Tempering for 1 h at 100 C in a magnetic field causes less two-phase decomposition of martensite than when tempering is carried out by the normal procedure. Decomposition when steel is tempered in a magnetic field after thermal, mechanical and magnetic treatment, is less intensive. Author

N83-31797# Electricity Council, London (England).
ELECTRO-CHEMICAL SYNTHESIS OF ORGANO-METALLIC NICKEL COMPOUNDS
H. Lehmkukl and W. Leuchte 1983 6 p refs Transl. into ENGLISH from J. of Organomet. Chem. (Netherlands), v. 23, 1970 p C30-C32
(BLL-OA-Trans-3018-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

High yields of transition metal organic compounds it was found, can be obtained by electro-chemical reduction of appropriate transition metal salts in aprotic solvents in the presence of the olefin, the complex of which is to be formed, or of other ligands. Solutions of nickel-acetyl-acetonate in pyridine, tetrahydrofuran or di-methoxy-ethane are very suitable for preparing the nickel complexes. Tetra-alkyl-ammonium-halides must be added as conducting salt to these nonconducting or only slightly conducting solutions. Author

N83-31798# British Library Lending Div., Boston Spa (England).
NATURE OF BORIDE PHASES FORMED DURING CRYSTALLIZATION OF AMORPHOUS Fe-B ALLOYS
G. V. Martinson, Yu. A. Skakov, and E. V. Shelekhov 1983 3 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 7, 1982 p 155-156
(BLL-M-35036-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The presence of defects in the boride phases, it was established by X-ray analysis, is explained by the presence of shear and possibly laminar defects in their crystal lattices. These defects can be cured by a higher holding temperature or longer holding time. Author

N83-31799# British Library Lending Div., Boston Spa (England).
MOTIVE FORCES OF STRUCTURAL CHANGES IN FERROSILICON DURING HEATING AFTER SLIGHT DEFORMATIONS
S. S. Gorelik and I. A. Popova 14 Jun. 1983 3 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Metall. (USSR), no. 7, 1982 p 156-157
(BLL-M-35039-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The basic force behind the structural changes during heating after small deformations of materials having relatively equilibrium structures is shown to be the spatial energy gradient, which is

more pronounced at the triple (three-way) joins. Processes reducing the grain boundary energy appear at a later stage of annealing.
Author

N83-31800# British Library Lending Div., Boston Spa (England).
STATE OF PRODUCTION OF BIMETALS AND PROSPECTS FOR ITS DEVELOPMENT
A. A. Bykov 1983 10 p refs Transl. into ENGLISH from Stal. (USSR), no. 7, 1982 p 61-64
(BLL-M-35010-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

A general examination is made of the range of application of bimetals in the Soviet economy and of the different bimetallic materials developed. Various cladding methods used in the production of bimetals are discussed. Measures needed for further improvement in the quality of bimetals and for increase in the range of application of multi-ply metals in different fields of industry are outlined. The savings resulting from greater use of bimetals will be considerable. Author

N83-31801# British Library Lending Div., Boston Spa (England).
PROCEDURE FOR TESTING MECHANICAL PROPERTIES OF HIGH-TENSILE ALLOY-STEEL BOLTS
A. G. Rogovskii, F. A. Shepeleva, and T. E. Akulintseva 17 May 1983 5 p Transl. into ENGLISH from Stal. (USSR) p 65-67
(BLL-M-26991-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Mechanical tests on M24 bolts of 40Kh steel and test pieces prepared from them are described and the results compared. It is concluded that, except for initial tests to establish the quality of the steel, the actual bolts should be tested; assessment of ductility on bolts improves quality control and saves on materials. Author

N83-31802# United Kingdom Atomic Energy Authority, Risley (England).
THE BEHAVIOUR OF WELDED HIGH STRENGTH GRAIN-REFINED STEELS UNDER CATHODIC STRESS CORROSION CRACKING CONDITIONS
H. Spaehn and G. Wagner 2 Jun. 1983 19 p refs Transl. into ENGLISH of conf. paper GASF Aktieugesellschaft, West Germany, 1983 Presented at VGB - Konf. Werkstoffe und Schweisstechnik im Kraftwerk 1983, Dusseldorf, 13-14 Jan. 1983
(BLL-Risley-TR-4741-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

Topics covered include: (1) mechanisms of hydrogen - induced cracking of steels; (2) damage in the power station caused by the action of hydrogen; and (3) the effect of tensile strength, alloy composition of the welded grain-refined steels, weld conditions, and stress relieving on the susceptibility to cathodic stress corrosion cracking in boiler feed water at 200 C; and on susceptability to stress corrosion cracking in the condenser of a benzene cracking plant. A.R.H.

N83-31803# British Library Lending Div., Boston Spa (England).
EFFECTIVENESS OF BORIDING OF STEEL IN MOLTEN SODIUM-BORON-SILICATE BATHS
A. S. Pomelnikova, D. I. Tarasko, and A. A. Govorov 24 May 1983 4 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Metall. (USSR), no. 6, 1982 p 95-97
(BLL-M-34988-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The parameters of the process of electrolytic boriding U10 steel in sodium-boron-silicate melts were investigated. The nature of the borided layers is described with the aid of metallography, X-ray analysis and microhardness measurements. The use of this type of melt/bath enables components to be borided immediately after mechanical working and the boriding operation can be combined with heat treatment, for example, quenching. Initial descaling by pickling does not alter the kinetics of the boriding process. Author

N83-31804# British Library Lending Div., Boston Spa (England).
DEPENDENCE OF LATTICE SPACINGS OF THE SmCo5 PHASE ON QUENCHING TEMPERATURE
A. S. Lileev, V. P. Menushenkov, and Yu. D. Yagodkin 17 May 1983 4 p Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Metall. (USSR) p 151-152
(BLL-M-34952-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

A precise measurement of the lattice spacings of the SmCo5 phase in cast and sintered alloys quenched from temperatures of 1260 to 700 C was carried out with the aim of clearing up the present uncertainty about the boundaries of its homogeneous range. The known dependence of the c/a ratio on composition was used to find the samarium content in the phase. Author

N83-31805# British Library Lending Div., Boston Spa (England).
ALLOY WITH ENHANCED DAMPING PROPERTIES
V. N. Ten, S. M. Krivosh, and Zh. K. Amanzholov 17 May 1983 3 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Metall. (USSR) p 152
(BLL-M-34953-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The internal friction of aluminum alloys containing dispersed alumina particles was studied and found to be several times greater than that of technical-purity aluminum and silumin. Author

N83-31806# British Library Lending Div., Boston Spa (England).
ANALYSIS OF EXPERIMENTAL DATA ON ROLLING OF CORROSION-RESISTANT STEEL WITH HYDRAULIC THRUST
A. V. Tretyakov, G. N. Migacheva, A. Kh. Osadchii, A. N. Kozlov, and V. K. Aleksandrov 14 Jun. 1983 5 p refs Transl. into ENGLISH from Stal (USSR), no. 7, 1982 p 49-50
(BLL-M-35007-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The experimental rolling of corrosion-resistant 12Kh18N1OT steel strip on a 2000 mill proves the effectiveness of a system employing hydraulic thrust cylinders on the backup rolls with the force on the housing screws kept constant for controlling strip thickness variation. The system can be used effectively for eliminating $>$ or $=$ 2.3/s frequencies. The system has two modes of operation. Author

N83-31807# British Library Lending Div., Boston Spa (England).
PRODUCTION OF AN ALUMINIUM-LEAD ALLOY IN MICROGRAVITY
Erich Hodes and Michael Steeg 1983 15 p ref Transl. into ENGLISH from Z. fuer Flugwiss. und Weltraumforsch. (West Germany), v. 2, 1978 p 357-341
(BLL-M-28685-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Production of an AlPb alloy with zero gravity was attempted. The aim was to get an alloy with a uniform fine lead distribution in the Al matrix, since certainly coarse accumulations of lead in a friction bearing material resulting from inner notch effect considerably reduce the fatigue strength of friction bearings made of it.
Author

N83-31808# British Library Lending Div., Boston Spa (England).
CHARACTERISTICS OF HEAT-TREATMENT OF R6M5 HIGH-SPEED POWDERED STEEL CONTAINING TITANIUM CARBIDE
V. S. Panov, V. G. Khromov, and Yu. F. Kots 1983 3 p refs Transl. into ENGLISH from Izv. (USSR), no. 5, 1982 p 156-157
(BLL-M-34959-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The best possible heat-treatment is established for R6M5 high-speed powdered tool steel containing 5% titanium carbide, namely a 1220 C hardening temperature, cooling in oil, a tempering temperature of 560 to 570 C and a tempering rate of 3. Author

N83-31809# British Library Lending Div., Boston Spa (England).
INFLUENCE OF TEMPERATURE-DEFORMATION CONDITIONS ON MECHANICAL PROPERTIES OF ROLLED PLATE AFTER STRAIGHTENING
G. V. Stepanov, L. D. Perelman, M. S. Podgaskii, and A. B. Maksihov 1983 4 p Transl. into ENGLISH from Stal (USSR), no. 5, 1982 p 56

(BLL-M-26987-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The changes in mechanical properties of plates owing to straightening, it is shown, have to be taken into consideration in the development of cold- and hot-bending procedures, and that cyclic bending can be used in fullscale conditions as an element for work hardening plates over a wide range of temperatures. Once more powerful straightening machinery has been devised it will be possible to transfer operations associated with improvement in mechanical properties from the basic equipment (rolling mills and heat-treatment plants) to auxiliary equipment. Author

N83-31810# British Library Lending Div., Boston Spa (England).
PROBLEM OF CORROSION-RESISTANT STEELS
B. Rzhegak and M. Zezulova 1983 4 p Transl. into ENGLISH from Stal (USSR), no. 5, 1982 p 75-76
(BLL-M-26995-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Developments taking place in Czechoslovakia in the field of corrosion-resistant steels and their production, ranges of application and economy are presented from the point of view of steelmaker and steel consumer. Author

N83-31811# British Library Lending Div., Boston Spa (England).
THE AGING OF Co-20 PERCENT Ni - 6.5 PERCENT Nb ALLOY
K. V. Varli and E. V. Milyaeva 1983 3 p Transl. into ENGLISH from Izv. (USSR), p 150-151
(BLL-M-34951-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

It was established, as a result of research into the Co-20% Ni-6.5% Nb alloy, that decomposition of super-saturated solid solution takes place by a continuous reaction, but only in the case in which a phase isomorphous with the matrix is precipitated. (Co, Ni)3Nb phase with Cu3Au type ordering is thus precipitated out of solid solution with a face-centred lattice at temperatures between 550 and 700 C, and (Co, Ni)3Nb phase of Co3W type ordering is precipitated out of solid solution with a hexagonal lattice at temperature of 750 C and above. Decomposition is of an interrupted nature when non-isomorphous (Co, Ni)3Nb phase, and Co3W type ordering, is precipitated out of the initial face-centered cubic solid solution. Author

N83-31812# British Library Lending Div., Boston Spa (England).
PROTECTIVE COATINGS FOR MARINE CABLES
E. M. Romanova, B. G. Semenov, Kh. F. Senicheva, N. N. Konovlova, and V. R. Shunin 1983 4 p refs Transl. into ENGLISH from Stal (USSR), no. 6, 1982 p 64-65
(BLL-M-34971-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Research into improving the anti-corrosion properties of marine cables showed that aluminum or cupronickel coatings provide cables with the longest lives in sea water. Author

N83-31813# British Library Lending Div., Boston Spa (England).
SUITABILITY OF LOW-CARBON, FERRITIC-MARTENSITIC STEELS FOR COLD HEADING OF FASTENER COMPONENTS
S. A. Golovanenko, N. M. Fonshtein, A. A. Efimov, V. I. Falkon, and M. G. Amirov 1983 8 p refs Transl. into ENGLISH from Stal (USSR), no. 6, 1982 p 68-70
(BLL-M-34972-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

As water quenching of long components such as studs and pins produces an unacceptable amount of distortion for automatic assembly purposes, an alternative strengthening treatment was devised involving hardening of the steel by cold drawing with reductions of up to 60 to 65%. As a high work hardening exponent is one of the main criteria of cold drawability, the authors examined the ability of long products duplex ferritic-martensitic (dual-phase) steels to work harden in the same way as the strip used for pressing of automotive body panels. Author

N83-31814# British Library Lending Div., Boston Spa (England).
DIRECTED SOLIDIFICATION OF 40KKhNM ALLOY AS A FURTHER MEANS OF IMPROVING THE TORQUES OF SMALL WINDING SPRINGS
E. K. Zakharov, V. I. Sharikov, T. N. Pioro, and V. P. Ovcharov 1983 5 p refs Transl. into ENGLISH from Stal (USSR), no. 6, 1982 p 60-61
(BLL-M-34969-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The 40KKhNM steel is used for 0.1 to 0.5 mm thick high strength cold rolled strip, from which large springs for mechanical for motors are produced. When the alloy was tested for producing thinner flattened strip (0.07 to 0.15 mm thick) 1-2 mm wide for the winding springs of wrist watches, difficulties were involved in drawing down to 0.5 to 0.6 mm diameter wire with the 75 to 85% deformation necessary to provide the springs with strengths of 2400 to 2600 MPa. Research into directed solidification confirmed that 40KKhNM alloy produced by the directed solidification method is quite easily drawn down to 0.4 to 0.6 mm diameter wire and has the strength and ductility particulars necessary to flatten it into spring strip and then produce S-shaped winding springs from it. Author

N83-31815# British Library Lending Div., Boston Spa (England).
ACHIEVEMENTS AND ADVANCED METHODS OF PROTECTION OF METAL AND METAL ARTICLES FROM CORROSION
1983 6 p Transl. into ENGLISH from Stal (USSR), no. 10, 1980 p 929-930
(BLL-M-34975-(5828.5)) Avail: British Library Lending Div., Boston Spa, Engl.

With reference to a broad program that was developed for the protection of metal from corrosion, the main ways in which losses of metal through corrosion can be reduced are outlined. Corrosion-resistant steels and alloys are reviewed. Exhibited products manufactured from the new corrosion-resistant materials are described with indication of the savings obtained. Author

N83-31816# British Library Lending Div., Boston Spa (England).
THERMODYNAMIC FUNCTIONS OF CARBON SOLUTION IN LIQUID NICKEL AND COBALT
Yu. V. Pozhidaev and B. P. Burylev 1983 5 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 6, 1982 p 9-11
(BLL-M-34981-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The partial molar enthalpies, free energies (Gibbs) and entropies of carbon solution in nickel and cobalt at 1500, 1600 and 1700 C were calculated from experimental data on the rate of evaporation of nickel and cobalt from nickel-carbon and cobalt-carbon melts. It appears that there are no marked anomalies in the formation of Co-C solutions, but that there are certain special features of carbon solution in liquid nickel. Author

N83-31817# British Library Lending Div., Boston Spa (England).
CALCULATION OF PHASE EQUILIBRIUM OF Si-O-C SYSTEM IN POLYNOMIAL FORM: COMMUNICATION 1
V. I. Berdnikov, V. G. Mizin, and I. V. Ryabchikov 1983 6 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 6, 1982 p 1-4
(BLL-M-34980-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

A method for presenting the temperature dependences of the equilibrium constants of chemical reactions in the form of certain polynomials is described. The method is used for calculating phase equilibrium in the Si-O-C system. Author

N83-31818*# Arizona Univ., Tucson. Dept. of Metallurgical Engineering.
ANALYSIS AND CALCULATION OF MACROSEGREGATION IN A CASTING INGOT, EXHIBIT D Final Report
David R. Poirier Jul. 1983 123 p refs Prepared in cooperation with General Electric Co., Huntsville, Ala.
(Contract NAS8-33573)

(NASA-CR-170846; NAS 1.26:170846; Rept-83HV004) Avail: NTIS HC A06/MF A01 CSCL 11F

Two solidification models were extended to encompass a broader range of solidification conditions consistent with the directional solidification (DS) methods at Marshall Space Flight Center (MSFC). The restriction to horizontal solidification was removed, so that any orientation from horizontal to vertical can be accommodated. The permeability model, central to the description of the flow of interdendritic liquid through the S/L zone, was extended to take into account the local variations in dendrite arm spacing as solidification progresses. This effect had not previously appeared in any solidification model. Author

N83-31819# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Chemistry.

ELECTROPLATING OF REFRACTORY METALS AND ALLOYS FROM FLUORIDE MELT Final Report, Jan. 1980 - Dec. 1983

R. A. Bailey 22 Mar. 1983 40 p refs

(Contract DAAG29-79-C-0035)

(AD-A127116; FR-1; ARO-15916.2-MS) Avail: NTIS HC A03/MF A01 CSCL 13/8

This project involved an investigation of electroplating of refractory metals, chiefly chromium, from the molten LiF-NaF-KF ternary eutectic. Initial objectives were to establish the mechanisms of the electro-reduction processes, especially for chromium, to explore the conditions that might lead to thick, coherent, electrodeposited coatings of chromium, and to examine the effects of co-deposits of other elements on the properties of the deposits. The electrochemical behavior of other refractory metals, tantalum and niobium, was also examined. Author (GRA)

N83-31820# Army Construction Engineering Research Lab., Champaign, Ill. Engineering and Materials Div.

EFFECTS OF HIGH HEAT INPUT WELDING OF CONSTRUCTION STEELS A36, A514, AND A516 Final Report

Robert A. Weber Jan. 1983 49 p refs

(DA Proj. 4A7-62731-AT-41)

(AD-A127083; CERL-TR-M-326) Avail: NTIS HC A03/MF A01 CSCL 13/8

This report documents the results of a study of shielded metal-arc (SMAW) and gas metal-arc welding (GMAW) butt weld tests using high heat inputs of 60 to 90 kJ/in. (2362 to 3543 J/mm). The steels used in this study were American Society for Testing and Materials (ASTM) Specifications A36, A514, and A516. Plate thicknesses were 3/4 to 1 in. (19 to 25mm). It was concluded that strength levels were generally reduced by the higher heat inputs, but impact properties were not affected. A table of recommended heat inputs for the steels and electrodes investigated during this study is given. Author (GRA)

N83-31821# Ames Lab., Iowa.

METAL CLUSTERS AND EXTENDED METAL-METAL BONDING IN METAL OXIDE SYSTEMS

Robert E. McCarley 1982 19 p refs Presented at the Symp. of Inorganic Chem.: Toward the 21st Century, Bloomington, Ind., 16-19 May 1982 Prepared in cooperation with Iowa State Univ., Ames

(Contract W-7405-eng-82)

(DE83-003793; IS-M-388; CONF-8205114-2) Avail: NTIS HC A02/MF A01

The results of recent investigations of the synthesis and structures of ternary and quaternary molybdenum oxide compounds having metal-metal bonded cluster units of infinite chains are presented. In all cases the average oxidation state of molybdenum is less than 4+, the lowest state previously known in structurally characterized oxide phases. New compounds containing discrete clusters are LiZn2Mo3O8 and Zn3Mo3O8 with triangular units, and Ba1 14Mo8O16 with two variants of rhomboidal tetranuclear units, one having regular and the other distorted rhomboidal geometry. Infinite metal-metal bonded chains consisting of Mo6 octahedral cluster units fused on opposite edges are found in the new compounds NaMo4O6, Ba5(Mo4O6)s, Sco 75Zn1 25Mo4O7, Tio 5Zn1 5Mo4O7 the effects of the differing metal-based electron counts in the repeat units of the infinite chains among these compounds are discussed with reference to metal-metal bond order and structural variations within the units. DOE

N83-31822# Massachusetts Inst. of Tech., Cambridge.

ADVANCED ALUMINUM-LITHIUM BASE ALLOYS PRODUCED BY RAPID SOLIDIFICATION FROM THE MELT Final Report, 8 Feb. 1981 - 30 Jun. 1982

Nicholas J. Grant Apr. 1983 10 p

(Contract DAAG29-81-K-0035; ARPA Order 4104)

(AD-A127571; ARO-18192.1-MS-A) Avail: NTIS HC A02/MF A01 CSCL 11/6

A paper entitled 'Lithium-Containing 2024 Aluminum Alloys Made from Rapidly Solidified Powders,' by W. Wang and N. J. Grant was presented. A second study, entitled 'Structure-Property Relationships of Rapidly Solidified Al-Mg-Li Alloys' by W. Wang and N. J. Grant, was also initiated under this contract, but is far from being completed within the one year span. Nevertheless, since the research was started under the DARPA (ARO) contract, the very interesting results of the research are summarized in this final report. A third study, which was initially started as an ONR (DARPA) program, is an analytical study which took about 4 years to complete. Based on the content of this study and its initiation under DARPA support, the program was continued as part of this effort. The study was recently completed under other funding. This study was entitled 'Notched Tensile Properties of Radidly Solidified and Ingot Based Aluminum Alloys' by S. Kang and N. J. Grant. GRA

N83-31823# Houston Univ., Tex. Dept. of Mechanical Engineering.

NONDESTRUCTIVE STRESS MEASUREMENTS IN ALUMINUM Interim Report, Feb. - May 1983

K. Salama, G. C. Barber, and N. Chandrasekaran Apr. 1983 10 p refs Presented at the 14th Symp. on Nondestructive Evaluation, San Antonio, 19-21 Apr. 1983

(Contract N00014-82-K-0496)

(AD-A127699) Avail: NTIS HC A02/MF A01 CSCL 14/2

The effects of applied stress on the temperature dependence of 10 MHz ultrasonic longitudinal velocity have been studied in aluminum 6061-T6. Velocities of longitudinal ultrasonic waves were measured as a function of temperature in several specimens using a pulse-echo overlap system. Experiments were performed with the stress applied in a direction parallel to and perpendicular to the ultrasonic propagation direction. In all temperature dependence measurements, the ultrasonic velocity is found to decrease linearly with temperature, and the slope of the line of best fit of ultrasonic velocity versus temperature is found to vary considerably when the specimens are subjected to stress. The results obtained when the stress is applied in a direction parallel to the ultrasonic propagation show that the temperature dependence of ultrasonic velocity increases linearly with either applied tensile or compressive stress. In the case of stress applied perpendicular to the ultrasonic propagation, the results indicate that the temperature dependence decreases linearly with either applied tensile or compressive stress. Calibration curves relating the relative change in the temperature dependence of ultrasonic velocity to applied stress are constructed. Using these calibration curves, the sensitivity in determining unknown applied stresses in aluminum is estimated to be + or - 10 MPa. Author (GRA)

N83-31824# Avco Lycoming Div., Stratford, Conn.

INTEGRALLY CAST LOW-COST COMPRESSOR Final Technical Report, 26 May 1978 - 25 Mar. 1982

Barton H. Hessler, Michael S. Muntner, Don Cargo, and B. Roopchand Warren, Mich. TACOM 3 Jan. 1983 134 p refs

(Contract DAAK30-78-C-0039; MM&T Proj. T785097)

(AD-A127663; TACOM-TR-12673) Avail: NTIS HC A07/MF A01 CSCL 11/6

The low pressure compressor stages of the AGT-1500 engine are designed as separately bladed assemblies requiring extensive precision machining and grinding. Cost savings could be achieved if the compressor stages were integrally cast in order to eliminate

many machining operations. The casting of precision parts involving very thin leading and trailing edges was achieved in a multi-phased effort; acceptable product yields were achieved with the first and second stage wheels and not with the fifth stage. A follow-on effort will be required in order to support implementation of program results. GRA

N83-31825# Naval Research Lab., Washington, D. C.
ON FATIGUE CRACK GROWTH IN A Ti-4, 5Al-5Mo-1.5Cr ALLOY WITH METASTABLE BETA-PHASE Final Report
Charles M. Gilmore, George R. Yoder, and M. Ashraf Imam 10 May 1983 15 p refs
(RR0220148)
(AD-A128048; NRL-MR-5067) Avail: NTIS HC A02/MF A01 CSCL 11/6

Fatigue crack growth behavior was examined in a Ti-4.5Al-5Mo-1.5Cr alloy, for two different levels of beta-phase metastability. The resistance to fatigue crack growth appears to be marginally enhanced with the presence of metastable beta-phase in a microstructure also containing some primary alpha-phase of high aspect ratio. This enhancement appears slightly greater for beta-phase water quenched from 899 deg C, than as more slowly cooled in helium from this same solution treatment temperature, at approximately an air ooling rate. In the case of the former, nearly full retention of solute in the beta-phase is apparent, while in the latter, significant precipitation of econdary alpha-phase is evident in thin foil transmission electron micrographs.
Author (GRA)

N83-31826# Vought Corp. Advanced Technology Center, Inc., Dallas, Tex. Dept. of Structures and Materials Research.
ROLL-BONDED 300M/1010 STEEL METAL-METAL LAMINATES: FORGEABILITY, TOUGHNESS, FATIGUE, AND STRESS CORROSION Final Report, 18 Sep. 1980 - 18 Dec. 1981
L. E. Sloter Jun. 1982 104 p refs
(Contract N00019-80-C-0575)
(AD-A127541; ATC-R-92000/2CR-20) Avail: NTIS HC A06/MF A01 CSCL 11/6

The fabrication of Alloy 300M/1010 steel metal-metal laminates in thick section by hot bonding is described and discussed. The results of the forgeability testing of the roll-bonded laminate plate and the tensile, fracture toughness, fatigue, and stress-corrosion cracking properties of the roll-bonded and roll-bonded and forged laminate material and 300M monolithic control material are reported, evaluated, and discussed. Two thick laminate billets in which eighteen layers of 300M low alloy steel separated by seventeen interleaves of 1010 mild steel have been prepared by hot roll bonding from plate and sheet stock. Cylindrical specimens machined from these billets have been forged in both open and closed dies and the laminate forgeability established. The forgeability of the laminate in the longitudinal direction, i.e., material flow perpendicular to the lamellar plane, is limited to low strains, less than -27%, by the hot strength of the interlamellar bonds and the plastic buckling resistance of the laminate. The forgeability in the transverse direction, i.e., material flow parallel to the lamellar plane, is limited only by the acceptable reorientation of laminate fiber caused by die shape and the frictional characteristics of the process, the transverse flow of the layers and interleaves being completely stable in the 300M/1010 system. GRA

N83-31827# Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering.
ION-BOMBARDMENT EFFECTS ON THE FATIGUE LIFE OF STAINLESS STEEL UNDER SIMULATED FUSION FIRST-WALL CONDITIONS Ph.D. Thesis
Gordon Edward Kohse Feb. 1983 116 p refs
(Contract DE-AC02-78ET-52027)
(DE83-007145; DOE/ET-52027/6) Avail: NTIS HC A06/MF A01

An experiment which uses the MITR-II 5 MW research reactor to simulate several aspects of the anticipated environment of a fusion reactor first wall is described. Pressurized tube specimens are subjected simultaneously to stress and temperature cycling, surface bombardment by energetic helium and lithium ions and bulk irradiation by high-energy neutrons. Analysis of the samples is aimed primarily at determining the behavior of the ion bombarded surface layer, which has a depth of 2.5 micrometers, with particular reference to possible effects on the fatigue life of the material.
DOE

N83-31828# Brown Univ., Providence, R. I. Dept. of Engineering.
SOME ASPECTS OF THE PLASTIC DEFORMATION OF PHASE MIXTURES WITH COARSE MICROSTRUCTURES
J. Gurland Oct. 1982 30 p refs Presented at the Yield, Flow and Fracture in Polycrystals Meeting, Glasgow, 1 Sep. 1982 Submitted for publication
(Contract DE-AC02-80ER-10556)
(DE83-001624; DOE/ER-10556/94; CONF-820982-1) Avail: NTIS HC A03/MF A01

Plastic deformation of two-phase alloys, the partition of stress and strain between the soft and hard constituents, and the applicability of mixture laws are discussed. Dual-phase steels are considered in particular. At all strains, plastic deformation takes place mainly in the ferrite. The martensite resists plastic deformation at low strain but is ductile. The martensite particles supply the desirable dispersion hardening effect, enhanced strain hardening rate, and resistance to plastic instability such as necking, while yielding plastically at high strains. DOE

N83-31829# Princeton Univ., N. J. Plasma Physics Lab.
DIFFUSION OF HYDROGEN AND DEUTERIUM IN Zr-Al
R. J. Knize and J. L. Cecchi Oct. 1982 9 p refs
(Contract DE-AC02-76CH-03073)
(DE83-002214; PPPI-1947) Avail: NTIS HC A02/MF A01

Optimization of getter performance necessitates a detailed understanding of the getter operation for a variety of experimental parameters, including pressure, temperature, getter mass, and getter thickness. For pumping at low pressures or during slow desorption, the getter operation will be dependent primarily on surface kinetics, which have been described previously. During pumping at higher pressures or during rapid desorption, bulk diffusion may play an important role. The first measurements of the diffusivities of hydrogen (D/sub H/) and deuterium (D/sub D/) in Zr-Al as determined from detailed analysis of desorption are presented. DOE

N83-31830# Pacific Northwest Lab., Richland, Wash.
INFLUENCE OF COMPOSITION AND SUBSTRATE BIAS ON STRUCTURE AND INERT-GAS CONTENT OF SPUTTER-DEPOSITED Ni-La ALLOYS
R. W. Knoll and E. D. McClanahan Sep. 1982 17 p refs Presented at 29th Natl. Symp. on Am. Vacuum Soc., Baltimore, 16 Nov. 1982
(Contract DE-AC06-76RL-01830)
(DE83-002716; PNL-SA-10545; CONF-821111-16) Avail: NTIS HC A02/MF A01

X-ray diffraction patterns show that the disappearance of crystallinity in the deposit occurs gradually as the La content increases. At the same time, the deposit becomes saturated with Kr. Because there is no evidence of crystalline La metal or Ni-La intermetallic phase in the diffraction data, it may be concluded tha each La atom creates a highly disordered (amorphous) region in the lattice, and that this region contains interstitial voids large enough to capture inert gas atoms. Saturation of the gas content with respect to La/Ni ratio might commence when these disordered regions begin to impinge upon one another. Finally, if inert gas atoms occupy interstitial voids within the deposit, then determination of the gas trapping characteristics of the material, using inert gas ions of different sizes, may be a means of studying the structure of glassy vapor-deposited materials. For example, the size distribution of the interstitial voids might be determined in this manner. DOE

N83-31831# Pacific Northwest Lab., Richland, Wash.
EFFECTS OF MICROSTRUCTURE ON LIGHT ION IRRADIATION CREEP IN NICKEL

C. H. Henager, Jr., E. P. Simonen, E. R. Bradley, and R. G. Stang Oct. 1982 23 p refs Presented at TMS/AIME Fall Meeting, St. Louis, 24 Oct. 1982
(Contract DE-AC06-76RL-01830)
(DE83-003467; PNL-SA-10335; CONF-821049-5) Avail: NTIS HC A02/MF a01

The concept of inhomogeneous slip or localized deformation is introduced to account for a weak dependence of irradiation creep on initial microstructure. Specimens of pure Ni with three different microstructures were irradiated at 473 deg K with 15 to 17 MeV deuterons in the PNL light ion irradiation creep apparatus. A dispersed barrier model for climb-glide creep was unable to account for the observed creep rates and creep strains. The weak dependence on microstructure was consistent with the SIPA creep mechanism but a high stress enhanced bias had to be assumed to account for the creep rates. Also, SIPA was unable to account for the observed creep strains. The modeling utilized rate theory calculations of point defect fluxes and transmission electron microscopy for sink sizes and densities. DOE

N83-31832# California Univ., Berkeley. Lawrence Berkeley Lab.
CRYSTALLOGRAPHY OF LATH MARTENSITE AND STABILIZATION OF RETAINED AUSTENITE
M. Sarikaya Oct. 1982 182 p refs
(Contract DE-AC03-76SF-00098)
(DE83-003714; LBL-15111) Avail: NTIS HC A09/MF A01

TEM was used to study the morphology and crystallography of lath martensite in low and medium carbon steels in the asquenched and 200 C tempered conditions. The steels have microduplex structures of dislocated lath martensite and continuous thin films of retained austenite at the lath interfaces. Stacks of laths form the packets which are derived from different 111 sub A variants of the same austenite grain. The residual parent austenite enables microdiffraction experiments with small electron beam spot sizes for the orientation relationships (OR) between austenite and martensite. All three most commonly observed ORs, namely Kurdjumov-Sachs, Nishiyama-Wassermann, and Greninger-Troiano, operate within the same sample. DOE

N83-31833# California Univ., Berkeley. Lawrence Berkeley Lab.
EFFECT OF MICROSTRUCTURE ON FATIGUE CRACK GROWTH IN DUPLEX FERRITE-MARTENSITE STEELS
J. A. Wasynczuk Jun. 1982 70 p refs
(Contract DE-AC03-76SF-00098)
(DE83-003715; LBL-15110) Avail: NTIS HC A04/MF A01

Monotonic tensile and fatigue crack growth test have been performed on AISI 1018 and Fe/2Si/0.1C steels with duplex ferrite-martensite (DFM) microstructures. The effect of microstructure on mechanical properties was examined. Two distinct martensite distributions were produced in AISI 1018 DFM. The primary differences between the two were ferrite and martensite particle sizes. It was found that tensile fracture was sensitive to both martensite distribution and volume fraction. For a given volume fraction of martensite, large particle sizes increased strength but drastically reduced ductility. The volume fraction of martensite influenced tensile properties according to the rule of mixtures. Threshold stress intensity ranges for fatigue crack growth in AISI 1018 DFM were found to be unaffected by the distribution or the volume fraction of martensite. Mid-growth range fatigue crack growth rates in AISI 1018 DFM were increased when particle sizes were large. DOE

N83-31834# California Univ., Berkeley. Lawrence Berkeley Lab.
DESIGN OF STRONG, DUCTILE, DUPLEX LOW ALLOY STEELS
Sep. 1982 32 p refs Presented at Intern. Conf. on Recent Develop. in Speciality Steels and Hard Mater., Pretoria, 8 Nov. 1982
(Contract DE-AC03-76SF-00098)
(DE83-002606; LBL-15006; CONF-821109-2) Avail: NTIS HC A03/MF A01

This paper is aimed at summarizing the current alloy design program at Berkeley which utilize the concept of two-phase steels as a means of optimizing the mutually exclusive properties strength, toughness, and ductility. The underlying principle is to utilize composites whereby the advantages of the second phase are optimized while the less desirable features of this phase are simultaneously mitigated by the presence of the other constituent phase. The size, distribution, shape and volume fraction of the second phase critically control the mechanical behavior of the dual phase systems. As a consequence, these structures offer a degree of metallurgical flexibility that is absent in single phase structures or in many precipitation strengthened systems, for attaining optimum sets of mechanical properties. Examples are presented of martensite/austenite (approx. 2 to 5%) mixtures designed for optimum combinations of high strength, toughness, and wear properties in medium carbon steels, e.g., for mining and agricultural applications, and martensite/ferrite (approx. 80%) structure for high strength, good formability and improved low temperature ductility in low carbon steels. DOE

N83-31835# California Univ., Berkeley. Lawrence Berkeley Lab. Materials Science and Molecular Research Div.
STUDY OF INTERGRANULAR EMBRITTLEMENT IN Fe-12Mn ALLOYS Ph.D. Thesis
Hyung Jai Lee Jun. 1982 122 p refs
(Contract DE-AC03-76SF-00098)
(DE83-002623; LBL-14747) Avail: NTIS HC A06/MF A01

A high resolution scanning Auger microscopic study was performed on the intergranular fracture surfaces of Fe-12Mn steels in the as-austenitized condition. Fracture mode below the ductile-brittle transition temperature was integranular whenver the alloy was quenched from the austenite field. The intergranular fracture surface failed to reveal any consistent segregation of P, S, As, O, or N. The occasional appearance of S or O on the fracture surface was found to be due to a low density precipitation of MnS and MnO2 along the prior austenite boundaries. An AES study with A(+) ion sputtering showed no evidence of manganese enrichment along the prior austenite boundaries, but a slight segregation of carbon which does not appear to be implicated in the tendency toward intergranular fracture. Addition of 0.002% B with a 1000 C/1h/WQ treatment yielded a high Charpy impact energy at liquid nitrogen temperature, preventing the intergranular fracture. DOE

N83-31836# Argonne National Lab., Ill. Materials Science Div.
A STUDY OF THE URANIUM-ALUMINUM-SILICON SYSTEM
A. E. Dwight Sep. 1982 44 p refs
(Contract W-31-109-eng-38)
(DE83-002345; ANL-82-14) Avail: NTIS HC A03/MF A01

The U-Al-Si system was investigated in the composition range from U to U-80 at.% Al to U-75 at.% Si. More than 260 binary and ternary alloys were arc melted and studied by metallographic and X-ray powder diffraction techniques, in the as-cast condition and after thermal treatment at temperatures ranging from 700 to 1040 C. One or possibly two ternary compounds of undetermined crystal structure exist at or near U2AlSi2. The binary silicides U3Si, U3Si2, and USi can dissolve only small amounts of Al in solid solution, but the higher silicides U3Si5, USi/sub 2-x/, and USi3 dissolve increasingly larger amounts of Al. Of the three binary aluminides, UAl2 can dissolve more than 12 at.% Si in solid solution. UAl3 forms a continuous solid solution with USi3, and UAl4 is not present in alloys containing more than 3 at.% Si. DOE

N83-31837# Ames Lab., Iowa. Dept. of Materials Science and Engineering.
EARLY STAGES OF SULFIDATION OF IRON AND IRON-CHROMIUM ALLOY IN HYDROGEN SULFIDE Ph.D. Thesis
P. B. V. Narayanacharyulu Jul. 1982 90 p refs
(Contract W-7405-eng-82)
(DE83-004969; IS-I-1016) Avail: NTIS HC A05/MF A01

Sulfidation of polycrystalline iron and an Fe-25 wt % Cr alloy at various partial pressures of H2S in the temperature range of -170 C to 500 C was studied in situ in an ESCA spectrometer, and the sulfidized layers were investigated by depth profiling in an Auger spectrometer. The role of surface oxygen during

sulfidation was investigated. The mode of sulfidation of sputter clean iron was found to involve several stages: associative adsorption of H2S at low temperatures, dissociative adsorption of H2S at around ambient temperature, and the formation of first a sulfur deficient iron sulfide and then stoichiometric FeS at slightly elevated temperatures as the H2S pressure or the time of exposure was increased. Iron sulfides are more readily formed on the oxidized iron surface than on the sputter clean surface. Chromia (Cr2O3) was found to be stable in an H2S atmosphere at < or equal to 250 C, but was converted to chromium sulfide at 300 C. DOE

N83-31838# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
RAPID SOLIDIFICATION STUDIES OF NI3AI ALLOYS
C. C. Koch, J. A. Horton, C. T. Liu, O. B. Cavin, and J. O. Scarbrough 1982 6 p refs Presented at the 3rd Conf. on Rapid Solidification Processing: Principles and Technol., Gaithersburg, Md., 6 Dec. 1982
(Contract W-7405-eng-26)
(DE83-004648; CONF-821223-2) Avail: NTIS HC A02/MF A01

Rapidly solidified foils of Ni3Al(24 at. % Al) with and without additions of boron (500 and 1000 wt ppM) were prepared in an arc-hammer apparatus. The bend ductility, microhardness, and microstructure of the foils were studied as a function of solidification rate, which was defined by foil thickness. Boron-free Ni3Al samples exhibited brittle behavior over the entire range of solidification rates used (foil thicknesses 20 to 100 microns). However, boron-containing samples, which were ductile for foil thickness greater than 45 microns showed a transition to brittle behavior in the range of thickness of 30 to 45 microns. The high hardness of the rapidly quenched foils (450 DPN) remained approximately constant in this transition range. Electron microscopy revealed a complex anti-phase boundary (APB) structure that could not be correlated to the mechanical behavior. DOE

N83-31839# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Materials Science and Mineral Engineering.
LATH MARTENSITES IN LOW CARBON STEELS
M. Sarikaya and G. Thomas 1982 14 p refs Intern. Conf. on Martensitic Transformations, Leuven, Belgium, 9-12 Aug. 1982
(Contract DE-AC03-76SF-00098)
(DE83-002622; LBL-14506; CONF-820898-1) Avail: NTIS HC A02/MF A01

The morphology and crystallography of lath martensite in low and medium carbon steels were studied by transmission electron microscopy and diffraction. The steels have microduplex structures of dislocated lath martensite (a < b much less than c) with fairly straight boundaries and continuous interlath thin films of retained austenite. Stacks of laths (i.e., single crystals of martensite) form the packets which are derived from different (111) transformation variants of austenite. Microdiffraction experiments directly allow the determination of the orientation relationships between austenite and martensite. Relative orientations of adjacent individual laths cluster about common orientations from small to large angular differences all around a common < 110 > direction. The overall microstructure and orientations result from minimization of the total strain and shape deformation. DOE

N83-31840# Los Alamos Scientific Lab., N. Mex. Materials Science and Technology Div.
STRAIN HARDENING OF HEAVILY COLD-WORKED METALS
S. S. Hecker and M. G. Stout 1982 87 p refs Presented at the TMS/AIME Fall Meeting, St. Louis, 23-24 Oct. 1982
(Contract W-7405-eng-36)
(DE83-003544; LA-UR-82-3446; CONF-821049-7) Avail: NTIS HC A05/MF A01

It is demonstrated that strain hardening in torsion cannot be correlated with axisymmetric deformation by the von Mises effective stress strain criterion. In fcc materials, the flow stress levels and strain hardening rates are typically lower in torsion and saturation, only at lower stress levels. In bcc iron, a low saturation stress is observed for torsion, whereas linear hardening is observed for axisymmetric extension. Much of the discrepancy in flow curves can be explained by texture. It is demonstrated that a crystallographic effective stress-strain criterion based on evolving average Taylor factors provides the proper magnitude correction for torsional flow curves in fcc materials. The simple crystallographic analysis does not fully explain the hardening response following deformation path changes and multidirectional loading. 96 references, 42 figures. DOE

N83-31841# Ames Lab., Iowa.
HALIDE AND CHALCOGENIDE CLUSTERS OF THE EARLY TRANSITION METALS
Robert E. McCarley 1982 44 p refs Presented at the Metal Clusters In Chem. Conf., London, 20-21 May 1982 Prepared in cooperation with Iowa State Univ., Ames
(Contract W-7405-eng-82)
(DE83-003792; IS-M-389; CONF-8205139-1) Avail: NTIS HC A03/MF A01

New clusters and compounds with extended metal-metal bonding of the transition elements of Group VI have been discovered at a startling pace in the last ten years. Excluding the interesting variety of metal-metal bonded dimers, prior to 1970 the only discrete cluster compounds known were the trinuclear M3X13 type first elucidated in the compound Zn2Mo3O8 and derivatives based upon the M6X84+ metal halide units. Subsequently many new cluster types have been found with both halide and chalcogenide bridging ligands, and the number of metal atoms ranging from three to twelve in the discrete units. Still more recent work has demonstrated the stability of structures with infinite chains of metal-metal bonded repeat units consisting of metal octahedra sharing edges or faces. Such compounds offer characteristics of both the elemental metals from which they are formed and the more conventional isolated cluster species. DOE

N83-31842# Ames Lab., Iowa. Dept. of Physics.
MAGNETIC-RESONANCE STUDIES OF REACTIVELY SPUTTERED AMORPHOUS SILICON-HYDROGEN ALLOYS Ph.D. Thesis
Mark E. Lowry Jul. 1982 231 p refs
(Contract W-7405-eng-82)
(DE83-004958; IS-T-1019) Avail: NTIS HC A11/MF A01

Proton magnetic resonance and electron paramagnetic resonance (EPR) data are presented for several reactively sputtered amorphous silicon-hydrogen alloys and for a few amorphous silicon-hydrogen-deuterium alloys. Proton nuclear magnetic resonance (NMR) absorption measurements are interpreted as evidence for significant inhomogeneity in the local hydrogen density: there is a phase of the material, in which the hydrogen bonded to Si is randomly distributed with average local density 3.39 x 10 to the 21st power 1/cubic cm, there is a hydrogen cluster defect with average local hydrogen density 4.34 x 10 to the 22nd power 1/cubic cm, in the lower hydrogen concentration samples there is a third phase of the material which has no H. Proton NMR spin-lattice relaxation measurements as a function of both temperature and H concentration were interpreted. The mechanism of spin-lattice relaxation in both cases involves spin diffusion to relaxation centers. DOE

N83-31843# Ames Lab., Iowa.
ACTIVITY OF HYDROGEN IN METAL-HYDROGEN SYSTEMS: STRONTIUM, THORIUM-NITROGEN AND VANDAIUM ALLOYS Ph. D. Thesis - Iowa State Univ.
Stephen Otto Nelson Jul. 1982 80 p refs
(Contract W-7405-eng-82)
(DE83-004976; IS-T-998) Avail: NTIS HC A05/MF A01

The dissolution of H gas was studied using pressure composition isotherms in Sr, Th-N and V alloys containing either Nb, Cr or Ti. Direct H equilibrium vapor pressure measurements were performed in the Sr-H and Th-N-H systems at 973 to 1173 K and 623 to 1123 K, respectively. Isopiestic solubility was used to measure the H equilibrium pressures for the V alloys at 223 to 473 K. In all the alloys studied, the reaction of hydrogen with the metal phase was exothermic and hydrogen followed Sieverts' law over a considerable range of hydrogen concentration. The enthalpy

of solution of H in the Sr and the enthalpy of formation of ThNH/sub x/ are -14.3 + or - 1.2 kcal;/mol H and -16.3 + or - 1.5 kcal/mol H2, respectively. Enthalpies of solution of H for the V alloys ranged from -8.0 to -10.5 + or - 0.3 kcal/mol H. Additions of T to V dramatically enhanced the isopiestic solubility of H, Cr significantly reduce the solubility and Nb moderately increased the solubility. DOE

N83-31844# Du Pont de Nemours (E. I.) and Co., Aiken, S.C. Savannah River Lab.
HEAT TREATING EFFECTS ON ENVIRONMENTAL HYDROGEN EMBRITTLEMENT OF NICKEL
G. R. Caskey, Jr. and L. P. McCabe 1982 34 p refs Presented at the TMS/AIME Fall Meeting, St. Louis, Mo., 24-28 Oct. 1982 (Contract DE-AC09-76SR-00001)
(DE83-004921; DP-MS-82-21; CONF-821049-9) Avail: NTIS HC A03/MF A01

Environmental hydrogen embrittlement to Nickel 200, Duranickel 301 (registered trademark of International Nickel Company, Inc.), and Beryllium Nickel was evaluated by measuring fracture strain of smooth and notched tensile specimens in high-pressure hydrogen. Hydrogen damage was comparable in all three alloys when in the annealed condition, although absolute values of ductility differed. Aging of Duranickel 301 increased susceptibility to hydrogen damage. In contrast, neither graphitization of Nickel 200 nor aging of Beryllium Nickel to maximum hardness had much effect on hydrogen damage. Differences in hydrogen damage are attributed to the differing nature of the precipitate phases in each alloy. DOE

N83-31845# Ames Lab., Iowa.
HYDROGEN AND DEUTERIUM DIFFUSION IN VANADIUM ALLOYS Ph.D. Thesis
Harvey Morris Herro Jul. 1982 58 p refs
(Contract W-7405-eng-82)
(DE83-004964; IS-T-1000) Avail: NTIS HC A04/MF A01

H and D diffusion coefficients were measured between 473 and 230 K in alloys of vanadium containing Ti or Nb, using Boltzmann-Matano techniques. Both H and D diffusion decreased with H isotope concentration in all alloys at all temperatures. Effect of Niobium additions was to reduce the rate of H migration to a minimum in the 75 at. % Nb alloy. The rate of H migration decreased with Ti up to 30 at % Ti. The diffusion coefficients exhibited an Arrhenius temperature dependence and the resulting diffusion activation energy and D values both increased with Ti and with Nb to a maximum of 75 at % Nb. D diffusion activation energies were larger than corresponding H values in all alloys. The diffusion behavior found in these alloys is not well represented by current local deep trapping models. DOE

N83-31846# Ames Lab., Iowa. Dept. of Materials Science and Engineering.
MAGNETIC SUSCEPTIBILITY OF SCANDIUM-HYDROGEN AND LUTETIUM-HYDROGEN SOLID-SOLUTION ALLOYS FROM 2 TO 300 DEG K Ph.D. Thesis
Roger Joseph Stierman Dec. 1982 86 p refs
(Contract W-7405-eng-82)
(DE83-004786; IS-T-1040) Avail: NTIS HC A05/MF A01

Results for pure Sc show that the maximum and minimum in the susceptibility discovered earlier are enhanced as the impurity level of iron in scandium decreases. The Stoner enhancement factor, calculated from low-temperature heat capacity data, susceptibility data, and band-structure calculations show Sc to be a strongly enhanced paramagnet. Below 2 K, the magnetic anisotropy between the hard and easy directions of scandium decreases linearly with decreasing temperature, tending toward zero at 0 K. The large increase in the susceptibility of Sc at lower temperatures indicates magnetic ordering. Pure Lu and Lu-H alloys showed an anisotropy in susceptibility vs orientation; thus the samples were not random polycrystalline samples. Pure Lu shows the shallow maximum and minimum, but the increase in susceptibility at low temperatures is larger then previously observed. The susceptibility-composition dependence of the Lu-H alloys also did not match other data. DOE

N83-31847# Ames Lab., Iowa.
STUDY OF THE ANOMALOUS BEHAVIOR OF THE ELECTRICAL RESISTIVITY IN ALLOYS NEAR THE PrNi5.0 COMPOSITION M.S. Thesis
Weol Dong Cho Dec. 1982 43 p refs
(Contract W-7405-eng-82)
(DE83-004787; IS-T-1049) Avail: NTIS HC A03/MF A01

Temperature (300 to 4.2 K), composition, and heat treatment dependence of resistivity of PrNi/sub x/ (x = 4.6 to 5.2) were studied. Metallography of the as-cast samples revealed that only PrNi5.0 is a single base alloy. Quenching from 1000 C produces a broader homogeneous region, from x = 5.0 to 5.2. Within the single phase region, the unit cell dimension decrease in the ao direction but increase in the co direction with increasing Ni content; total and cell volume decreases with Ni content. DOE

N83-31848# Deutsche Gold- und Silber-Scheideanstalt, Frankfurt am Main (West Germany). Fachbereich Forschung Metall.
RECOVERY OF PRECIOUS METALS FROM MATERIALS CONTAINING SELENIUM, TELLURIUM, ARSENIC AND ANTIMONY Final Report, Dec. 1980
Volker Jung, Bernd Deierling, and Reinhold Karl Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 40 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-050; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8,50

A process for removing Se, Te, As and Sb from materials containing noble metals is outlined. The material is treated with 30 to 50 weight-% KNO3 at 400 to 450 C continuously in a rotary kiln. In this step Se, Te, As and Sb are converted into soluble potassium salts. The oxidized material is leached at 80 to 100 C in order to bring Se, Te, As and Sb into solution, while the precious metals remain in the residue. Diluted sodium hydroxide solution is used for low tellurium materials; otherwise diluted sulfuric acid is used. To recover Se and Te from the leach solution, these elements are precipitated simultaneously with gaseous SO2. Results show that the procedure is of economic interest for materials containing at least 30 % noble metals. Author (ESA)

N83-31849# Deutsche Gold- und Silber-Scheideanstalt, Frankfurt am Main (West Germany). Fachbereich Forschung Metall.
DEVELOPMENT OF MOLTEN SALT BATHS FOR THE ELECTRODEPOSITION OF GOLD AND GOLD ALLOYS Final Report, Dec. 1980
Franz Simon Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 87 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-051; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18

A molten salt bath consisting of 70 Mol% KSCN and 30 Mol% NaSCN was developed for electrodeposition of gold and gold alloys. Conditions for reproducible Au/Cu electrodeposits with a gold content of 18 kt are: 0,5 w/o Au as KAu(CN)2, 5 w/o Cu as CuCN, 5 w/o KCN, 30 w/o H2O at a temperature of 403 K and a current density of 0,6 A/dsqm. The deposits are homogeneous and sufficiently tarnish resistent within the range of 15 to 24 kt. Measurements of the contact resistance after heat treatment on air at 353 K indicate that a caratage of > 21 is necessary to guarantee a satisfactory contact resistance. Because such Au/Cu deposits do not meet specifications, the alloys: Au/Cu/Pd, Au/Cu/Ag, Au/Cu/Ni, Au/Cu/Cd, Au/Pd, Au/Ag, Au/Ni and Su/Sn, were investigated, but no applicable systems for practical use result. Author (ESA)

N83-31850# Nippon Kokan Co. Ltd., Tokyo (Japan).
DEVELOPMENT OF HEAVY SECTION 3.5% Ni STEEL PLATES

WITH GOOD MECHANICAL PROPERTIES AFTER STRESS RELIEVING

M. Yamada, T. Takano, H. Tagawa, K. Matsui, I. Watanabe, and T. Kojima [1982] 29 p refs Transl. into ENGLISH of Article from Nihon Kokan Giho (Japan), no. 94, 1982 p 1-14
(PB83-178665) Avail: NTIS HC A03/MF A01 CSCL 11F

The conventional normalized type of 3.5% Ni steel can hardly secure the required strength and toughness after SR treatment because of its high susceptibility to SR embrittlement. The investigation indicated that the mechanisms of SR embrittlement was caused by coalescing and coarsening of carbides at the grain boundary and that is effective for the suppression of SR embrittlement to reduce a carbon content and to give a structure in which fine carbides are uniformly dispersed. Based on the results of this investigation, a normalized type 3.5% Ni steel was developed having a low carbon content and low contents of alloying elements such as Cu, Cr and Mo and showing an excellent resistance to SR embrittlement. As an example, performance test carried out with the base metal and welded joints of 100 mm thick steel plate clearly has strength and toughness fully satisfying the standards even after the strict SR treatment, as well as an excellent workability. Author (GRA)

N83-31851# Norges Tekniske Hoegskole, Trondheim.

REVIEW OF FACTORS AFFECTING MICROSTRUCTURE AND TOUGHNESS IN SIMULATED HEAT-AFFECTED ZONES OF STRUCTURAL STEELS

O. M. Akselsen 14 Sep. 1982 34 p refs
(PB83-180208; STF34-A82106; ISBN-82-595-3006-6) Avail: NTIS HC A03/MF A01 CSCL 11F

Included in the survey are conventional carbon-manganese, microalloy and low alloy steels. Simulation techniques were used to produce microstructures related to the coarse-grained region of the HAZ, i.e., peak temperatures in the range from 1200C to 1450C. The effects of maximum temperature and cooling rate of the simulation cycle are described in detail including multipass and post weld heat treatment. The influence of steel composition and microalloying are examined. Moreover, a comparison of toughness in simulated specimens and specimens taken from weldments is made. Finally, advantages/disadvantages of the thermal simulation technique are briefly discussed. Author (GRA)

N83-31852# Electricity Council Research Centre, Capenhurst (England).

AUSTENITIC THERMOCHEMICAL TREATMENTS IN A GLOW DISCHARGE

M. Booth, M. I. Lees, and A. M. Staines Jul. 1982 31 p refs
(PB83-184671; ECRC/M-1591) Avail: NTIS HC A03/MF A01 CSCL 13H

An investigation was undertaken to determine the viability of carburizing using a glow discharge treatment. A 20 kW plasma nitriding unit, modified to allow high temperature carburizing treatments to be performed, and a specially constructed plasma carburizing unit, having an additional hot zone for independent or assisted heating in the glow discharge process were used. The influence of material composition, atmosphere composition and gas flow rate were studied at a carburizing temperature of 950 C. Results indicated that a given carbon concentration profile is achieved more rapidly with the glow discharge treatment than in a conventional gas carburizing process and that the two types of carburizing units are equally effective. Using a simple model, calculated values of the diffusion coefficient of carbon in austenite were found to be similar to previously published data.
Author (GRA)

N83-31853# Council for Mineral Technology, Randburg (South Africa). Pyrometallurgy and Physical Metallurgy Div.

REVIEW OF CORROSION INHIBITORS: THEORY AND PRACTICE

Robert Trevor White 3 Jan. 1983 29 p refs In ENGLISH; AFRIKAANS summary
(PB83-181487; MINTEK-M66; ISBN-0-86999-598-7) Avail: NTIS HC A03/MF A01 CSCL 11F

The chemical water treatments available to the mining industry are diverse in composition, action, and efficiency. This review illustrates the mechanisms and uses of inhibitors for the prevention of corrosion over the whole range of aqueous systems. It should provide an understanding of the problems associated with the choice of inhibitors for use in plants. Author (GRA)

N83-31646# Max-Planck-Institut fuer Metallforschung, Stuttgart (West Germany).

OSTWALD RIPENING AND SOLIDIFICATION BEHAVIOR OF NEAR MONOTECTIC ZN-PB ALLOYS

A. Kneissel (Montanuniversitaet Leoben, Austria), P. Pfefferkorn (Montanuniversitaet Leoben, Austria), and H. Fischmeister *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 55-61 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31648# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Casting of Metals.

PRECIPITATION OF GAS PORES IN METALLIC METALS DURING COOLING UNDER MICROGRAVITY

H. Shahani and H. Fredriksson *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 71-78 refs Sponsored by Swedish Delegation of Space Research. (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31652# European Space Research and Technology Center, Noordwijk (Netherlands).

SOUNDING-ROCKET FLIGHT TEST OF AN ACOUSTIC MIXER BY MANUFACTURE OF A LEAD-ZINC EMULSION ALLOY IN MICROGRAVITY

P. F. Clancy, W. Heide (Battelle Inst., Frankfurt am Main), and D. Langbein (Battelle Inst., Frankfurt am Main) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 99-104 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31680# Commissariat a l'Energie Atomique, Grenoble (France). Lab. d'Etude de la Solidification.

IMPLICATIONS OF THE LACK OF WETTING AT THE MONOTECTIC GROWTH FRONT

B. Derby *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 277-280 refs Sponsored by ESA (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31681# Brussels Univ. (Belgium). Chimie-Physique 2.

CONVECTION-MARANGONI EFFECTS IN SOLIDIFICATION-MICROGRAVITY

A. Sanfeld, A. Steinchen, B. Billia (Aix-Marseille Univ., France), and L. Capella (Aix-Marseille Univ., France) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 281-283 refs Sponsored by Belgian Ministry of National Education, ESA, NATO and Les Instituts Solvay-Belgium (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31684# Ecole Nationale Superieure d'Electrochimie et d'Electrometallurgie Grenoble (France). Lab. de Thermodynamique et Physico-Chimie Metallurgiques.

MEASUREMENTS OF DIFFUSION COEFFICIENT OF COPPER IN LIQUID LEAD IN MICROGRAVITY BY THE GRAIN BOUNDARY GROOVING TECHNIQUE

O. Minster, C. Vahlas, C. Senillou, L. Coudurier, N. Eustathopoulos, and P. Desre *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 301-306 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31685*# Gelles (S. H.) Associates, Columbus, Ohio.

LOW-GRAVITY EXPERIMENTS ON LIQUID PHASE MISCIBILITY GAP (LPMG) ALLOYS: MATERIALS EXPERIMENTS ASSEMBLY (MEA)

S. H. Gelles, A. J. Markworth (Battelle Columbus Laboratories, Columbus), and C. E. Mobley (Ohio, State Univ. Columbus) *In*

ESA Mater. Sci. under Microgravity Jun. 1983 p 307-312 refs (For primary document see N83-31637 20-12)
(Contract NAS8-32952)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31686*# Rensselaer Research Corp., Troy, N. Y. Materials Engineering Dept.
CONVECTION EFFECTS AT SOLID-LIQUID INTERFACES: INFLUENCE OF GRAVITY
M. E. Glicksman, Q. T. Fang, S. R. Coriell (NBS, Washington, D.C.), and R. F. Boisvert (NBS, Washington, D.C.) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 313-317 refs Sponsored by NASA (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31687# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Casting of Metals.
THE EFFECT OF THE NATURAL CONVECTION ON THE SOLIDIFICATION OF METALLIC ALLOYS
H. Fredriksson *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 319-323 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31690# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Casting of Metals.
SOLDERING UNDER MICROGRAVITY
T. Carlberg and M. Liljendahl *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 337-342 refs Sponsored by Swedish Board for Space Activities (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31691# Politecnico di Milano (Italy). Dept. di Chimica Fisica Applicata.
AN ANALYSIS OF THE DRIVING FORCES IN LIQUID PHASE SINTERING
P. M. Ossi, F. Rossitto, R. Roberti, and G. Silva *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 343-345 refs Sponsored by CNR (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31692# Politecnico di Milano (Italy).
ADHESION OF METALS EXPERIMENT SIMULATION AND GROUND-BASED REFERENCE TEST RESULTS
F. Rossitto, P. G. Sona (Centro Informazione Studi Esperienze), G. Grugni (Centro Informazione Studi Esperienze), and G. Ghersini (Centro Informazione Studi Esperienze) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 347-351 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31693# Maschinenfabrik Augsburg-Nuernberg A.G., Munich (West Germany). Neue Technologie.
SKIN TECHNOLOGY: FUNDAMENTALS AND APPLICATIONS
H. Sprenger *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 353-358 refs Sponsored by Bundesministerium fuer Forschung und Technologie (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31701# Academy of Sciences (USSR), Moscow. Inst. for Space Research.
SOLIDIFICATION OF PbSn ALLOYS UNDER MICROGRAVITY CONDITIONS
L. L. Regel, I. V. Barmin, A. M. Duranchenko, and L. Oyunbilling *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 417-420 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N83-31854* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PHOSPHORUS-CONTAINING IMIDE RESINS Patent
Indra K. Varma (National Academy of Sciences-National Research Council, Washington, D.C.), George M. Fohlen, and John A. Parker, inventors (to NASA) Issued 26 Jul. 1983 6 p Filed 30 Jul. 1981 Supersedes N81-031314 (19 - 22, p 3042)
(NASA-Case-ARC-11368-1; US-Patent-4,395,557; US-Patent-Appl-SN-288267; US-Patent-Class-548-413; US-Patent-Class-548-415) Avail: US Patent and Trademark Office CSCL 11G

Bis- and tris-imides derived from tris (m-aminophenyl) phosphine oxides by reaction with maleic anhydride or its derivatives, and addition polymers of such imides, including a variant in which a mono-imide is condensed with a dianhydride and the product is treated with a further quantity of maleic anhydride. Such monomers or their oligomes may be used to impregnate fibers and fabrics which when cured, are flame resistant. Also an improved method of producing tris (m-aminophenyl) phosphine oxides from the nitro analogues by reduction with hydrazine hydrate using palladized charcoal or Raney nickel as the catalyst is described.
Official Gazette of the U. S. Patent and Trademark Office

N83-31855* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THERMAL BARRIER COATING SYSTEM HAVING IMPROVED ADHESION Patent
Robert C. Bill and James S. Sovey, inventors (to NASA) Issued 15 Jun. 1982 3 p Filed 28 Jan. 1981 Supersedes N81-24265 (19 - 15, p 2038)
(NASA-Case-LEW-1335901; US-Patent-4,335,190; US-Patent-Appl-SN-229233; US-Patent-Class-428-623; US-Patent-Class-428-633; US-Patent-Class-428-678; US-Patent-Class-427-34; US-Patent-Class-427-405; US-Patent-Class-427-219.2; US-Patent-Class-427-423;) Avail: US Patent and Trademark Office CSCL 11A

The adherence between a ceramic thermal barrier coating and a metal bond coating is improved by ion sputtering a ceramic film on the bond cost. A ceramic thermal barrier coating is then plasma-sprayed onto this primer film. This improves the integrity and strength of the interface between the plasma-sprayed ceramic layer and metallic bond coat which insures stronger adherence between the metal and the ceramic.
Official Gazette of the U.S. Patent and Trademark Office

N83-31856# Akron Univ., Ohio. Inst. of Polymer Science.
FRACTURE MECHANICS APPLIED TO ELASTOMERIC COMPOSITES
A. N. Gent Apr. 1983 27 p refs Submitted for publication
(Contract N00014-76-C-0408; NR Proj. 092-555)
(AD-A127000; TR-28) Avail: NTIS HC A03/MF A01 CSCL 11/10

Griffith introduced a general fracture criterion in 1920: a crack will grow only when enough energy is available in the system to cause further fracture. This simple concept has been applied to various tear processes in elastomeric materials by Rivlin and Thomas and to a variety of adhesive failures by Kendall. Their results are reviewed, with particular reference to the fracture and debonding of elastomeric composites. Two further cases are then considered: the detachment of an elastic matrix from a rigid spherical inclusion and the pull-out of inextensible cords from an elastic block in which they are embedded. GRA

N83-31857# Akron Univ., Ohio. Inst. of Polymer Science.
TEAR STRENGTH OF ELASTOMERS UNDER THRESHOLD CONDITIONS
A. K. Bhowmick, A. N. Gent, and C. T. R. Pulford Apr. 1983 26 p refs Submitted for publication Sponsored in part by General Dynamics Corp., Cabot Corp., and Lord Corp.
(Contracts N00014-76-C-0408; N00014-82-K-2015; NR Proj. 092-555)
(AD-A127006; TR-27) Avail: NTIS HC A03/MF A01 CSCL 11/10

Measurements have been made of the tear strength of several elastomeric materials under threshold conditions, i.e., in the swollen state and at high temperatures when dissipative contributions to the work of fracture are minimized. The materials studied were Neoprene WRT, PB, SBR, EPDM and a castable polysulfide material, LPN-32. They were crosslinked to different degrees, using a free-radical source, or sulfur, or a metal oxide as the crosslinking reagent. Values obtained for the threshold tear strength were similar in all cases, lying in the range 50 - 200 J/sq sq m. They appeared to be approximately proportional to E-1/2, where E is the tensile (Young's) modulus of the elastomer, as predicted by the theoretical treatment of Lake and Thomas. Values for networks with polysulfidic crosslinks were significantly higher than with monosulfide or C-C crosslinks, by about a factor of 2. Values for carbon-black-filled materials were higher also, by about the same factor, in comparison with the equivalent unfilled materials. These effects are attributed to rupture of labile crosslinks, or bonds to carbon black, prior to main-chain rupture. GRA

N83-31858# Akron Univ., Ohio. Inst. of Polymer Science.
FRACTURE TOUGHNESS OF POLYBUTADIENE AT CRYOGENIC TEMPERATURES
R. P. Burford Apr. 1983 36 p refs Submitted for publication
(Contract N00014-76-C-0408; NR Proj. 092-555)
(AD-A126999; TR-26) Avail: NTIS HC A03/MF A01 CSCL 11/9

An estimate of fracture toughness of crosslinked polybutadiene rubber at -180 degrees C has been made using the double torsion method. By using suitable specimen dimensions and strain rates, controlled crack propagation can be achieved, together with a constant compliance to crack length ratio. Strain energy release rated for this polymer, crosslinked with either dicumyl peroxide or sulphur, were found to be an order of magnitude higher than for linear, glassy thermoplastics. Crazing is considered to contribute to the high toughness observed. GRA

N83-31859# Princeton Univ., N. J. Dept. of Chemical Engineering.
EFFECT OF THE EXTENT OF CURE ON THE MODULUS, GLASS TRANSITION, WATER ABSORPTION, AND DENSITY OF AN AMINE-CURE EPOXY Progress Report, Apr. 1981 - Apr. 1983
John B. Enns and John K. Gillham Apr. 1983 46 p refs Submitted for publication
(Contract N00014-76-C-0200; NR Proj. 356-504)
(AD-A127090; TR-26) Avail: NTIS HC A03/MF A01 CSCL 11/9

The modulus, density, glass transition (Tg), and water absorption characteristics of an amine-cured resin (diglycidyl ether of bisphenol A (Epon 828)/ diaminodiphenyl sulfone (DDS) were studied as a function of extent of cure. The glass transition is a function of the extent of cure and reaches a maximum temperature, Tg, when it is completely cured; specimens with different extents of cure were formed by isothermal cure below Tg for different times. After slowly cooling, the density at each extent of cure was obtained at room temperature. Moisture absorption was monitored gravimetrically at 25 degrees C for two months at several humidity levels. The room temperature density and modulus decreased with increasing extent of conversion whereas the glass transition temperature and equilibrium water absorption increased. The equilibrium water absorption increased linearly with relative humidity, and the absorptivity increased linearly with specific volume. An interpretation of these anomalous results is made in terms of the nonequilibrium nature of the glassy state. The glass transition temperature increases as the extent of cure increases resulting in a material that is further from equilibrium at room temperature and therefore having more free volume and a greater propensity to absorb water. Author (GRA)

N83-31860# California Univ., Livermore. Lawrence Livermore Lab.
MICROSTRUCTURAL CHARACTERIZATION OF NUCLEAR-WASTE CERAMICS
F. J. Ryerson and D. R. Clarke (Rockwell International Corp., Thousand Oaks, Calif.) 22 Sep. 1982 20 p Presented at the 18th Ceramic Sci. Conf. on Adv. in Mater. Characterization, Alfred, N.Y. 16-18 Aug. 1982
(Contract W-7405-eng-48)
(DE83-000362; UCRL-88179; CONF-820891-1) Avail: NTIS HC A02/MF A01

Characterization of nuclear waste ceramics requires techniques possessing high spatial and X-ray resolution. XRD, SEM, electron microprobe, TEM and analytical EM techniques are applied to ceramic formulations designed to immobilize both commercial and defense-related reactor wastes. These materials are used to address the strengths and limitations of the techniques above. An iterative approach combining all these techniques is suggested. DOE

N83-31861# Rutgers - The State Univ., New Brunswick, N. J. Dept. of Mechanics and Materials Science.
THE EFFECT OF PLASTICIZER ON THE PIEZOELECTRIC PROPERTIES OF UNORIENTED POLYVINYLIDENE FLUORIDE FILMS
B. A. Newman, A. Sen, and J. I. Scheinbeim 28 Apr. 1983 24 p refs Submitted for publication
(Contract N00014-80-C-0795)
(AD-A127863; TR-2) Avail: NTIS HC A02/MF A01 CSCL 20/3

The effect of plasticizer content on the piezoelectric response of unoriented polyvinylidene fluoride was measured. The plasticizer was added both before and after poling. In both cases the piezoelectric strain constant d31 increased appreciably with increasing plasticizer content. When the plasticizer was added before poling, the piezoelectric stress constant e31 also increased with plasticizer content. The reverse effect was observed for e31 if the plasticizer was added after poling (probably due to film depolarization). These changes in d31 and e31 are related to the bulk mechanical and dielectric properties of plasticized films. Author (GRA)

N83-31862# National Bureau of Standards, Washington, D.C. Inorganic Materials Div.
STRUCTURAL RELIABILITY OF YTTRIA-DOPED, HOT-PRESSED SILICON NITRIDE AT ELEVATED TEMPERATURES Annual Report, 1 Oct. 1981 - 30 Sep. 1982
S. M. Weiderhorn and N. J. Tighe Mar. 1983 32 p refs
(Grant AF-AFOSR-ISSA-00013-83)
(AD-A127583; AFOSR-83-0277TR; NBSIR-83-2664) Avail: NTIS HC A03/MF A01 CSCL 11/2

The strength of yttria-doped, hot-pressed silicon nitride was investigated as a function of temperature and applied load. Data collected 1200 degrees C are presented in the form of a strength degradation diagram for an applied load of 350 MPa. At this temperature, the behavior of the yttria-doped material is found to be superior to that of magnesia-doped silicon nitride, in which creep results in the formation of microcracks that lead to strength degradation. By contrast, the yttria-doped material does not suffer from microcrack formation, or strength degradation at 1200 degrees C. At higher temperatures strength degradation does occur, and as a consequence, an upper limit of 1200 degrees C is recommended for yttria-doped, hot-pressed silicon nitride in structural application. Author (GRA)

N83-31863# Texas Univ., Austin. Dept. of Chemistry.
POLYMER FILMS ON ELECTRODES. PART 13: INCORPORATION OF CATALYSTS INTO ELECTRONICALLY CONDUCTIVE POLYMERS: IRON PHTHALOCYANINE IN POLYPYRROLE Progress Report, 1 Sep. 1982 - 31 Aug. 1983
Randy A. Bull, Fu-Ren Fan, and Allen J. Bard 26 Apr. 1983 22 p refs Submitted for publication
(Contract N00014-78-C-0592; NR Proj. 051-693)
(AD-A127700; TR-31) Avail: NTIS HC A02/MF A01 CSCL 07/4

Tetrasulfonated iron phthalocyanines (FePcS) can be incorporated into electronically conducting polypyrrole by electrochemical polymerization of pyrrole in the presence of FePcS. The FePcS modified glassy carbon electrodes catalyzed the reduction of O2 at

potentials 250 to 800 mV less negative than at bare glassy carbon or at polypyrrole-coated glassy carbon not containing FePcS. Rotating ring-disk experiments indicated some hydrogen peroxide formation at most pH's. However at high pH essentially exclusive non-catalyzed electrode. Author (GRA)

N83-31864# Rockwell International Corp., Thousand Oaks, Calif. Science Center.
THE CAD/CAM HANDBOOK FOR POLYMER COMPOSITE RELIABILITY, VOLUME 2 Final Report, 1 Nov. 1980 - 31 Oct. 1982
D. H. Kaelble Mar. 1983 200 p refs
(Contract DAAG29-80-C-0137)
(AD-A127721; SC5291.7FR-Vol-2) Avail: NTIS HC A09/MF A01 CSCL 11/4

Information on polymer composite reliability is given. The nomenclature of polymer relations, Weibull strength distributions, chemical characterizations of graphite-epoxy prepreg materials, listings of characterization methods, and results of non-destructive tests are given. R.J.F.

N83-31865# Rockwell International Corp., Thousand Oaks, Calif. Science Center.
CAD/CAM HANDBOOK FOR POLYMER COMPOSITE RELIABILITY, VOLUME 1 Final Report, 1 Nov. 1980 - 31 Oct. 1982
D. H. Kaelble Mar. 1983 198 p refs Sponsored in part by DOE
(Contract DAAG29-80-C-0137)
(AD-A127720; ARO-16393.3-MS; SC5291.7FR-Vol-1) Avail: NTIS HC A09/MF A01 CSCL 11/4

This handbook of polymer composite reliability introduces and discusses the subject of polymer composites from the viewpoint of atomic and molecular models. Thus the origins of stiffness, strength, extensibility, and fracture toughness in composite materials can be analyzed directly in terms of chemical composition and molecular structure. This discussion is introduced by a review of current concepts of composite reliability and composite characterization techniques. The central section of this discussion introduces the computer models which describe the relations between chemical, physical and mechanical responses of polymer composites. Six amplified CAD/CAM (computer aided design and manufacturing) models are demonstrated in the final sections. The personal computer program listings for these models are provided in an Appendix. The detailed effects of temperature, stress, strain, time and environmental exposure upon composite stiffness, strength and fracture toughness can be generated by mathematical simulation from atomic and molecular properties. By establishing clearly defined mathematical links between chemical and mechanical responses, the controlling influence of chemistry and characterization on composite mechanical reliability is clarified. GRA

N83-31866# California State Univ., Sacramento. Dept. of Chemistry.
SYNTHESIS OF HYDROXY-TERMINATED DINITROPROPYL ACRYLATE POLYMERS AND IMPROVED CHARACTERIZATION OF HYDROXY-TERMINATED PREPOLYMERS Final Scientific Report, Oct. 1980 - Oct. 1982
C. S. Kim Edwards AFB, Calif. Air Force Rocket Propulsion Lab. Mar. 1983 128 p refs
(Contract F04611-79-C-0009; AF Proj. 2303)
(AD-A127469; AFRPL-TR-83-002) Avail: NTIS HC A07/MF A01 CSCL 07/3

A synthesis method for hydroxy-terminated dinitropropyl acrylate polymers via free radical polymerization was developed. A new method to determine hydroxyl equivalent weight was also developed. The synthetic techniques and characterization methods which include determinations for equivalent weight, molecular weight and functionality, are described. Author (GRA)

N83-31867# Akron Univ., Ohio. Inst. of Polymer Science.
THE ROLE OF CHEMICAL BONDING IN ADHESION Annual Technical Report, 1 Mar. 1982 - 28 Feb. 1983
A. N. Gent and P. Dreyfuss Apr. 1983 25 p refs
(Contract N00014-76-C-0408; NR Proj. 092-555)
(AD-A127467) Avail: NTIS HC A02/MF A01 CSCL 11/9

Work over the past several years has shown that understanding the effect of chemical bonding on adhesion requires a knowledge of a variety of chemical and physical phenomena. Accordingly, current studies have covered a broad range of related topics. Those investigated during the period from March 1, 1982 to February 28, 1983 are summarized in this report, which describes eleven technical reports, fifteen papers and eleven presentations made during the year. GRA

N83-31868# Army Aviation Research and Development Command, St. Louis, Mo.
POLYURETHANE PAINT (PUP) CHEMICAL AGENT RESISTANT COATING (CARC) FOR ARMY AIRCRAFT
Silas G. Garrett 19 Apr. 1983 57 p
(AD-A128006; USAAVRADCOM-TR-83-F-5) Avail: NTIS HC A04/MF A01 CSCL 11/3

MIL-L-46159 paints have been determined to be highly absorptive of toxic chemical agents. Further, as the result of this characteristic and the relatively loose bonding of the paint molecular structure, decontamination is ineffective. These protective and tactical readiness deficiencies are offset by the adoption application of Polyurethane Paint (PUP) per MIL-C-46168. Routine logistical and maintenance costs are also reduced through the use of PUP. GRA

N83-31869# Thiokol Chemical Corp., Brigham City, Utah.
POLYCYCLIC HIGH ENERGY OXIDIZERS Progress Report, 1 Mar. 1982 - 28 Feb. 1983
J. C. Hinshaw Apr. 1983 20 p refs
(Contract N00014-81-C-0204)
(AD-A128309) Avail: NTIS HC A02/MF A01 CSCL 11/9

Efforts toward the synthesis of polycyclic high density, high energy oxidizers have involved examination of synthetic paths to the hexaazaadamantane framework. Routes examined include condensation of amides with an orthoformate, reaction of tris (acylamino) methanes with orthoformate and cyclizations based on acylated perhydrotriazines. The cyclization chemistry of a pentaazabicyclononadiene is also under investigation. Author (GRA)

N83-31870# Utah Univ., Salt Lake City. Dept. of Physics.
CONTACT NOISE IN SUPERIONIC CERAMICS Interim Technical Report
James J. Brophy May 1983 11 p refs Presented at the 7th Intern. Conf. on Noise in Phys. Systems, Montpellier (France), 17-20 May 1983
(Contract N00014-82-K-0603)
(AD-A127824; TR-1) Avail: NTIS HC A02/MF A01 CSCL 11/2

The objective of this study is to measure experimentally conductivity fluctuations in fast ionic conductors and to interpret results in terms of transport mechnisms in the solid and at crystal-electrode interfaces. Electrode propeties are expected to introduce experimental difficulties and it is well established that the electrochemical properties of electrical contacts to solid ionic conductors are conventionally avoided by employing high frequency ac techniques. Conductivity fluctuations, on the other hand, are most easily examined under dc conditions and at low frequencies. A series of experiments has been completed on the low frequency properties of contacts to sodium and silver beta alumina ceramics which give the noise characteristics of contacts alone and demonstrate that suitable electrodes for conductivity fluctutations can be devised. GRA

N83-31871# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Chemical Systems Lab.
SIMULTANEOUS DETERMINATION OF MOLAR ABSORPTION COEFFICIENTS AND EQUILIBRIUM CONSTANTS FOR MONOMER-DIMER EQUILIBRIA Progress Report, Sep. - 12 Aug. 1981
J. Richard Ward and Reginald P. Seiders Apr. 1983 39 p refs
(DA Proj. 1L1-61101-A-71A)
(AD-A128599; ARCSL-TR-82088) Avail: NTIS HC A03/MF A01

CSCL 11/9

The majority of methods for measuring dimerization constants requires that the pure monomer spectrum be known. This spectrum is obtained by successive dilution of a dye solution until Beer's law is obeyed. In practice, there is a limit where the absorbance of the solution is too small to measure precisely. Frequently, the dye is diluted with alcoholic-aqueous solutions to foster monomer formation. We have devised a general scheme to compute molar absorption coefficients and dimerization constants based on Monahan's method. Absorbances are measured for a series of dye concentrations. A nonlinear least-squares program then finds the best-fit monomer and dimer molar absorption coefficients. Absorbances are remeasured at various temperatures or with different dye concentrations and the calculation repeated. The mean molar absorption coefficients are computed from all the measurements; these values are then used to compute the dimerization constants at each temperature. GRA

N83-31872# Argonne National Lab., Ill.
EFFECTS OF IRRADIATION ON CERAMICS FOR FUSION-REACTOR APPLICATIONS
D. L. Porter Dec. 1982 61 p refs
(Contract W-31-109-eng-38)
(DE83-009468; ANL/FPP/TM-166) Avail: NTIS HC A04/MF A01

The irradiation effects on the engineering properties of some useful classes of ceramic materials was studied. Multiphase materials (glass ceramics and partially-stabilized zirconias) were irradiated at 400 and 550 C to fast ($E > 0.1$ MeV) neutron fluences approximately 2 x 10 to the 22th power n/sq cm. Fluorophlographic mica based glass ceramics were found susceptible to weakening due to void formation between mica plates. Composition variations within this class of glass ceramics seemed to cause sharp variations in the magnitude of the effect. Lithium silicate glass ceramic (ReX) showed sharp contrasts between the effects of ionization irradiation and displacement damage, neutron irradiation having little effect on the ReX structure while electron irradiation creating silicate vitrification and rapid structural annealing. DOE

N83-31873# Pittsburgh Univ., Pa. Dept. of Metallurgical and Materials Engineering.
HIGH-TEMPERATURE CORROSION OF CERAMICS Progress Report, 15 Jun. 1981 - 14 Jun. 1982
J. R. Blachere and F. S. Pettit Feb. 1983 44 p refs
(Contract DE-AC02-81ER-10915)
(DE83-008763; DOE/ER-10915/2; SETEC-MME-83-004) Avail: NTIS HC A03/MF A01

In this program, the corrosion of ceramics is studied from a mechanistic point of view. In an integrated fundamental approach the gaseous corrosion investigation is followed by that of deposit-modified gaseous corrosion and eventually by deep melt corrosion. The study of the gaseous corrosion of Al H CO2 and SO2-SO3 is almost completed. Particular emphasis has been placed on the interaction between SO3 and Al2O3 at the lower temperatures. A few additional experiments remain to characterize better the products and check some interpretations but the following conclusions have been obtained: (1) SiO2 and Al2O3 are very resistant to gaseous corrosion, (2) pure oxides had no measureable weight changes during exposure to all gases at 700 C and 1000 C, and (3) at 1400 C, silica devitrified and was reduced in wet hydrogen. The reaction of the aluminas at this temperature is related to their impurities and no reaction occurred with higher purity alumina single crystal. DOE

N83-31874# Monsanto Research Corp., Miamisburg, Ohio.
DIALLYL PHTHALATE PREPOLYMER CHARACTERIZATION AND TESTING IN FIBERGLASS FILLED MOLDING COMPOUNDS
Ruth B. Whitaker, Robert E. Schneider, and Roy J. Schumacher 21 Feb. 1983 21 p refs
(Contract DE-AC04-76DP-00053)
(DE83-009352; MLM-3039) Avail: NTIS HC A02/MF A01

A program was undertaken to identify an acceptable alternative to Dapon 35, an o-diallyl phthalate (DAP) prepolymer no longer available. Three o-DAP prepolymers from the Osaka Soda Company and four laboratory-scale prepolymers from Bendix-Kansas City were characterized and evaluated in DAP-fiberglass molding compounds. Gel permeation chromatography results for the Osaka prepolymers showed all three to be very close to one another in molecular weights (mw) and mw distributions, but slightly lower in both than Dapon 35. They are also slightly higher in monomer content. All three processed readily into DAP-fiberglass molding compounds and passed required physical property tests. One Osaka prepolymer was compounded into both asbestos and Orlon-DAP compounds on a production scale. Both compounds have passed all certification tests. The Bendix prepolymers were deliberately varied in mw distribution and mw distribution and higher in monomer content than Dapon 35. DOE

N83-31875# Rockwell International Corp., Golden, Colo. Energy Systems Group.
FERROMAGNETIC POROUS PLASTICS
Masafumi Moriya, Kazuo Hosoda, and Makoto Takai Feb. 1983 6 p Transl. into ENGLISH of Japanese Kokai Patent Publ. No. Sho-55-66933 (1980) 6 p
(Contract DE-AC04-76DP-03533)
(DE83-008679; RFP-Trans-383) Avail: NTIS HC A02/MF A01

This claim concerns a process for producing a ferromagnetic porous plastic. The ferromagnetic porous plastic is obtained by mixing a plastic with finely powdered ferromagnetic material and then foaming the mixture in the presence of a foaming agent. Detailed procedures are presented for making these plastics by using: (1) polypropylene and cobalt ferrite powder; (2) polyethylene and magnesium ferrite; (3) 2,2-bis(p-s1,2-epoxypropoxylphenyl) propane and cobalt ferrite powder; (4) polyvinyl chloride and powdered magnetite. A homogeneous dispersion of the ferromagnetic powder or foaming agent in the plastic can be obtained by adding surfactants such as stearic acid, oleic acid, lauric acid, linoleic acid, palmitic acid, as well as the salts of these acids. Ferromagnetic porous plastics can be used to remove suspended solids, colloidal substances, oils, organic compounds, algae, bacteria, microbes from municipal drinking water, sewage water and waste water. DOE

N83-31876# Kepling and Associates, Inc., Tulsa, Okla.
EVALUATION OF THE NORTH STANLEY POLYMER DEMONSTRATION PROJECT
K. J. Harpole and C. J. Hill Feb. 1983 38 p refs
(Contract DE-AC19-80BC-10033)
(DE83-006915; DOE/BC-10033/6) Avail: NTIS HC A03/MF A01

A review of the performance of the North Stanley Polymer Demonstration Project was completed. The objective of the cost-project was to evaluate the technical efficiency and economic feasibility of polymer-enhanced waterflooding as a tertiary recovery process in a highly heterogeneous and vertically fractured sandstone reservoir that has been successfully waterflooded and is approaching the economic limits of conventional waterflooding recovery. The ultimate incremental oil recovery from the project is estimated to be about 570,000 barrels (or approximately 1.4% of the original oil-in-place). This is significantly less than the original recovery predictions but does demonstrate that the project was technically successful. The lower-than-anticipated recovery is attributed principally to the extremely heterogeneous nature of the reservoir. The updated economic analysis under current (mid-1982) economic conditions indicates that the North Stanley project would be commercially feasible if polymer injection began in 1982, rather than in 1976. DOE

N83-31877# California Univ., Livermore. Lawrence Livermore Lab.
BROWNIAN-DYNAMICS COMPUTER SIMULATIONS OF ONE DIMENSIONAL POLYMER MODEL. 1: SIMPLE POTENTIALS
R. Cook (Lafayette Coll.) and L. L. Livornese Nov. 1982 26 p refs Presented at Am. Phys. Soc., New York, 24 Jan. 1983
(Contract W-7405-eng-48)
(DE83-002468; UCRL-88321; CONF-830111-1) Avail: NTIS

HC A03/MF A01

Brownian Dynamics computer simulation results are presented on a simple one-dimensional polymer model which contains the essential features of rotational angle flexibility. Comparison is made with analytical treatments of the model. DOE

N83-31878# Ames Lab., Iowa.
IRREVERSIBLE COOPERATIVE PROCESSES ON LATTICES Ph.D. Thesis
David Ray Burgess Dec. 1982 194 p refs
(Contract W-7405-eng-82)
(DE83-004795; IS-T-1035) Avail: NTIS HC A09/MF A01

Kinetic models for irreversible cooperative processes on lattices are developed. Hierarchial rate equations for the probabilities of configurations of empty sites are discussed in detail and the concept of shielding is introduced. Several, exactly soluble, one-dimensional processes are treated including: (1) those incorporating a cooperative range of influence of one lattice vector beyond a fixed number of blocking sites; (2) filling in stages for highly repulsive interactions; (3) correlation functions; (4) configurational entropy of ring lattices; (5) processes with competing events; (6) periodic lattices; and (7) limited mobility. Approximate solution techniques for analyzing other one-dimensional processes are also discussed. A special irreversible kinetic process on a two-dimensional square lattice is also treated and a computer program is described which has been developed to generate the appropriate two-dimensional kinetic equations. DOE

N83-31879# Ames Lab., Iowa. Dept. of Chemistry.
STUDIES OF A MOLYBDENUM-MOLYBDENUM BONDED SPECIES. 1: SYNTHESIS AND CHARACTERIZATION OF A REDUCTION PRODUCT OF Cs3Mo2Cl8H. 2: MIXED SULFUR/CHLORINE-SUBSTITUTED HEXANUCLEAR AND MOLYBDENUM CLUSTERS Ph.D. Thesis
Matthew Hermes Luly Jul. 1982 122 p refs
(Contract W-7405-eng-82)
(DE83-04971; IS-T-959) Avail: NTIS HC A06/MF A01

A black powder isolated from the reaction of Cs3Mo2Cl8H and zinc in refluxing pyridine, Mo1.0Cl1.1py0.8, was studied. The material is amorphous to X-rays, and the infrared spectrum indicates coordinated pyridine and chlorine. The X-ray photoelectron spectrum indicates one type of molybdenum and shows both terminal and bridging chlorine are present in the ratio of 1.5:1.0. Mo1.0Cl1.1py0.8 is stable at elevated temperatures and can be heated in vacuo for over 24 hours at 300 C with little change in composition. The best description of this material seems to be a highly bridged, metal-metal bonded cluster or polymer. Mo6Cl12 was reacted with various sulfur containing reagents to prepare mixed chlorine sulfide Mo6X8 lusters. These clusters were characterized by X ray powder diffraction, X ray photoelectron spectroscopy, and infrared spectroscopy. High reaction temperatures (> 200 C) with high ratios of NaSH to Mo6Cl12 (16:1) result in decomposition of the No6X8 cluster. DOE

N83-31880# Bendix Corp., Kansas City, Mo.
METHOD FOR THE PREPARATION OF POLYMERS
Mansanori Aime and Tetuya Nakata Nov. 1982 16 p Transl. into ENGLISH of Japanese Patent No. 1963-10344 (26 Jun. 1963) 16 p
(Contract DE-AC04-76DP-00613)
(DE83-004941; BDX-613-2874) Avail: NTIS HC A02/MF A01

Polymerization method for the preparation of prepolymers through the polymerizations of diallyl phthalate is disclosed, in which an ether of a phenol and allyl alcohol or an organotin compound is added the amount of 0.1 to 5% by weight based on the amount of diallyl phthalate. DOE

N83-31881# Rockwell International Corp., Golden, Colo. Energy Systems Group.
FIREPROOF CERAMICS AND PROCESS FOR THEIR MANUFACTURE
Norman H. Stradley and Harry C. Dunegan Dec. 1982 10 p Transl. into ENGLISH of German Patent No. 2214523 10 p
(Contract DE-AC04-76DP-03533)
(DE83-005021; RFP-Trans-352) Avail: NTIS HC A02/MF A01

Hard, wear-resistant ceramics which are practically not porous, are the object of this invention. They comprise a solid solution of alumina and chromium oxide. They are made by a process in which a porous ceramic article of alumina is impregnated at least 5 times up to saturation with an aqueous chromic acid solution, then heated to 600 to 1000 C to remove the solvent and reduce the chromic acid, and heated to 1100 to 1400 C. Hardness, wear resistance, and abrasion resistance data are given. DOE

N83-31882# Bayer A.G., Leverkusen (West Germany).
POLYMER INTERMEDIATES FROM LIMONENE Final Report, Oct. 1981
Gerhard Klein Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 16 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-053; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 3,50

The replacement of petrochemically manufactured isophorone diamine or isophorone diisocyanate by limonene diamine obtained from limonene, a renewable raw metarial, is studied. Limonene was transformed to a bisformamide in a double Ritter reaction with hydrocyanic acid. The direct dehydration of this bisformamide to the corresponding dinitrile using acetic anhydride was not successful. However, the bisformamide is dehydrated to the diisonitrile by reaction with phosgene. The diisonitrile is thermally rearranged to the dinitrile. By catalytic hydrogenation, this is converted into a diamine in an overall yield of 36.5% and by subsequent phosgenation into a diisocyanate in an overall yield of 31%. By these products, isophorone diamine or isophorone diisocyanate which are manufactured on a petrochemical basis, can be replaced. However, the manufacturing costs of limonene diamine are considerably higher than for isophorone diamine.
Author (ESA)

N83-31883# National Bureau of Standards, Washington, D.C. National Measurement Lab.
ANALYSIS OF OXIDE AND OXIDE/MATRIX INTERFACES IN SILICON NITRIDE Interim Report
Nancy J. Tighe Jul. 1982 28 p refs
(Contract EA-77-A-01-6010)
(PB83-178699; NBSIR-82-2574) Avail: NTIS HC A03/MF A01 CSCL 11B

In the study, these three interfacial layers were removed and analyzed using transmission electron microscopy, light microscopy, X-ray energy analysis and X-ray diffraction. Oxide scales were produced on hot-pressed silicon nitride samples by heating in air at 1000C, 1200C, and 1400C for 1/2 to 1000 hr. The phases in the oxide scale were found to occur in layers that were ordered according to the phase diagrams for the oxide mixtures. Crystalline and amorphous phases were present in all specimens examined. The oxynitride and amorphous phases are present in as-pressed billets at triple junctions and along grain boundaries. The elements in the amorphous phases were identified using energy dispersive X-ray analysis. In the paper, the phases found in the oxide scales are characterized and the relationships between the oxide scale, the oxide matrix interface and the mechanical properties are discussed. Author (GRA)

N83-31884# National Bureau of Standards, Washington, D.C. National Engineering Lab.
DEVELOPMENT OF INTERIM PERFORMANCE CRITERIA FOR RESTORATION COATINGS FOR PORCELAIN ENAMEL SURFACES
James F. Seiler and Paul G. Campbell Jun. 1982 56 p refs Sponsored in part by Dept. of Housing and Urban Development (PB83-185553; NBSIR-82/2553; HUD-0002697) Avail: NTIS HC A04/MF A01 CSCL 11C

A study was performed to develop interim performance criteria for restoration coatings for porcelain enamel surfaces. The

laboratory study consisted of evaluating five restoration coatings had been applied to porcelain enamel test panels with various surface conditions. Performance characteristics of the coatings examined included appearance, adhesion, impact resistance, stain resistance, and fungal resistance. Existing test methods were used in the study if appropriate methods were available. However, the laboratory studies led to the development of a new cyclic exposure test and the use of a newly developed method for measuring adhesion. Adhesion of the coatings was the performance characteristic most sensitive to change with time of exposure to the newly developed cyclic test. Author

N83-31885# Simpson Gumpertz and Heger, Inc., Cambridge, Mass.
STRUCTURAL PLASTICS DESIGN MANUAL. VOLUME 2: PHASES 2 AND 3, CHAPTERS 5 - 10
Frank J. Heger, Richard E. Chambers, and Albert G. Dietz Aug. 1982 693 p refs Sponsored in part by Urban Mass Transportation Administration and Department of Housing and Urban Development and American Society of Civil Engineering and American Society of Civil Engineers and Dow Chemical Co. and Monsanto Co. and Owens-Corning Fiberglass Corp. and DuPont de Nemours (E.I) and Co. and Rohm and Haas Co.
(PB83-185595; HUD-0002712; FHWA/TS-82/216) Avail: NTIS HC A99/MF A01 CSCL 11I

This manual provides guidelines to structural engineers designing plastics and reinforced plastics structural components. It discusses applications commonly used in building construction, transportation structures and vehicles, process industries, sanitary facilities, and marine vessels and structures. The volume devotes space to the fundamentals of elastic response of structures and provides quantitative methods for analysis and design of plates, beams and axial stressed members, flat sandwich structures, and thin rings and shells fabricated from plastic materials. It also reviews the tests and standards used for evaluating structural plastics' fire resistance. Tables, diagrams and chapter notes and references are supplied. Author (GRA)

N83-31663# Technische Universitaet, Clausthal-Zellerfeld (West Germany). Inst. fuer Nichmetallische Werkstoffe.
REACTIONS IN GLASS MELT SYSTEMS
G. H. Frischat, M. Braedt, and W. Beier *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 161-165 refs Sponsored by Bundesministerium fuer Forschung und Technologie and DFVLR (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N83-31886*# Aerojet Liquid Rocket Co., Sacramento, Calif.
LOX/HYDROCARBON FUEL CARBON FORMATION AND MIXING DATA ANALYSIS
J. Fang Nov. 1983 184 p refs
(Contract NAS3-22823)
(NASA-CR-168066; NAS 1.26:168066) Avail: NTIS HC A09/MF A01 CSCL 21H

By applying the Priem-Heidmann Generalized-Length vaporization correlation, the computer model developed by the present study predicts the spatial variation of propellant vaporization rate using the injector cold flow results to define the streamtubes. The calculations show that the overall and local propellant vaporization rate and mixture ratio change drastically as the injection element type or the injector operating condition is changed. These results are compared with the regions of carbon formation observed in the photographic combustion testing. The correlation shows that the fuel vaporization rate and the local mixture ratio produced by the injector element have first order effects on the degree of carbon formation. Author

N83-31887# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
DECISION MODELS FOR CONDUCTING AN ECONOMIC ANALYSIS OF ALTERNATIVE FUELS FOR THE ICE ENGINE M.S. Thesis
Clifton F. Garrison, Jr. Mar. 1983 97 p refs
(AD-A127954) Avail: NTIS HC A05/MF A01 CSCL 21/4

An economic analysis is made of vehicles powered by compressed natural gas (CNG), alcohol, and electric vehicles (EV's) as possible replacements for gasoline-powered vehicles. Advantages and disadvantages of vehicles powered by the various fuels are discussed and determinations of their suitability are made based on vehicle performance characteristics and fuel availability. CNG and EV's are determined to be viable alternatives based on current state-of-the-art technology. Alcohol is not retained as a viable alternative because of limited fuel availability. Models are presented for determining the total life cycle cost for gasoline, CNG, and EV's. A fleet of seventy-two vehicles at the Naval Postgraduate School is used as an example to compare the cost of each alternative. A linear program is used to determine the mix of gasoline, CNG, and electric vehicles that satisfy mission requirements for the least total fleet life cycle cost and to perform sensitivity analysis on the cost determinants. A generalized formulation is also presented to allow a vehicle fleet manager to use the methodology of this thesis as an aid to evaluating the potential of alternatively-fueled vehicles in different situations. GRA

N83-31888# Materials Research Labs., Ascot Vale (Australia). Physical Chemistry Div.
POTASSIUM 4-HYDROXYAMINO-5,7-DINITRO-4,5- DIHYDROBENZOFURAZANIDE 3-OXIDE, THE FIRST IN A SERIES OF NEW PRIMARY EXPLOSIVES
William P. Norris and Robert J. Spear Feb. 1983 20 p refs
(AD-A128557; MRL-R-870; AR-003-059) Avail: NTIS HC A02/MF A01 CSCL 19/1

The title compound (3) is the first in a series of new structural analogues of the primary explosive KDNBF. (3) readily forms in nearly quantitative yield from reaction of 4,6-dinitrobenzo-furazan 1-oxide with hydroxylamine in the presence of KHCO3 /MeOH, and is isolated as free flowing nearly speherial crystals. The sensitivity of (3) to mechanical, electrostatic and thermal stimuli is typical of a primary explosive. Admixtures of (3) with lead azide are extremely promise as a replacement for tetrazene in percussion and stab sensitive compositions. As a single increment, (3) ignites readily but power output is poor and 'sooty' ie oxygen deficient. Author (GRA)

N83-31889# City of Tallahassee, Fla.
ALTERNATE FUELS AND ENERGY SOURCES FOR ELECTRIC DEPARTMENT: CITY OF TALLAHASSEE, FLORIDA
Oct. 1982 122 p Prepared in cooperation with Burns and McDonnell, Kansas City, Mo.
(Contract DE-FG01-80RA-50318)
(DE83-001694; DOE/RA-50318/1) Avail: NTIS HC A06/MF A01

The city's existing electric system is summarized as well as projected loads and fuel consumption. Conventional fuels including coal and nuclear power are discussed. Renewable nonconventional utility fuels considered include municipal solid waste, municipal sewage sludge, wood and other cellulosic materials, synthetic fuels, liquefaction of coal, gasification of coal, coal oil mixtures, nonconventional burning methods, and oil shale. Load management and fuel conservation are included, as are such alternate energy sources as solar, geothermal, and wind power. Installation of a new steam generator at a plant to burn solid fuel, conversion of existing boilers, and improvement of existing units are discussed as well as generating units fired by renewable fuels. A central heating and cooling plant with cogeneration is considered and a

new coal-fired boiler's economic feasibility is compared with that of using a coal-oil mixture. DOE

N83-31890# Sweany (Ralph S.), Crothersville, Ind.
SMALL CONTINUOUS ETHANOL PLANT FOR FARM Final Report
Ralph S. Sweany 27 Apr. 1982 37 p
(Contract DE-FG02-81AF-92009)
(DE82-014675; DOE/AF-92009/2) Avail: NTIS HC A03/MF A01

This project was designed to provide the farmer with sufficient information to build his own continuous production ethanol plant. The plant description, schematic drawing, operation summary, and plant fabrication details are presented. DOE

N83-31891# Oak Ridge Y-12 Plant, Tenn.
TECHNICAL CONSIDERATIONS IN CHOOSING ALCOHOL FUELS FOR LESS-DEVELOPED COUNTRIES
J. M. Googin, A. L. Compere, and W. L. Griffith 1982 16 p refs Presented at the 5th Intern. Conf. on Alternative Energy Source, Miami Beach, Fla., 13 Dec. 1982 Prepared in cooperation with ORNL, Tenn.
(Contract W-7405-eng-26)
(DE83-004644; CONF-821213-2) Avail: NTIS HC A02/MF A01

Current US and Latin American interest has focused on replacement and substitution of gasoline by ethyl alcohol. However, extending diesel fuel, which is used in agricultural engines and necessary transport, is the basic concern. Three attractive methods, involving the use of vegetable or tree oils, alcohols, in some cases with water, can be successfully used to extend or replace diesel fuels: (1) fatty acid - alcohol - water microemulsions in diesel fuel, (2) higher alcohol esters of fatty acids, and (3) direct diesel fuel extension with higher alcohols. All three methods of extending diesel fuel are amenable to an appropriate technology situation. DOE

N83-31892# Environmental Protection Agency, Ann Arbor, Mich. Emission Control Technology Div.
PRELIMINARY PERSPECTIVE ON PURE METHANOL FUEL FOR TRANSPORTATION Final Report
Sep. 1982 100 p refs
(PB83-180232; EPA-460/3-83-003) Avail: NTIS HC A05/MF A01 CSCL 21D

The relative advantages and disadvantages of the use of pure methanol fuel in motor vehicles designed for its use over conventional fuels was examined. The use of pure or neat methanol and not methanol gasoline blends for use in existing automobiles was specifically addressed. Five basic issues are discussed: (1) the availability of raw materials for methanol production such as coal, natural gas, wood, biomass, municipal waste and peat; (2) the relative availability of technology and environmental effects of producing methanol and conventional fuels from nonpetroleum domestic feedstocks; (3) the practicality of distributing a new fuel for use in motor vehicles; (4) the exhaust emissions and fuel efficiency of motor vehicles operating on pure methanol fuel relative to those of conventional vehicles; and (5) the economics of producing, distributing and using methanol as a motor vehicle fuel. GRA

N83-31893# Battelle Pacific Northwest Labs., Richland, Wash.
PACIFIC NORTHWEST REGIONAL BIOMASS PROGRAM Final Report, 15 Feb. - 15 Sep.
D. E. Eakin and L. J. Sealock, Jr. Chicago, Ill. Gas Research Inst. Oct. 1982 81 p refs Sponsored by Gas Research Inst.
(PB83-188623; GRI-81/0136) Avail: NTIS HC A05/MF A01 CSCL 21D

Available background data and recent studies to determine the future potential of gaseous fuels derived from biomass in the Pacific Northwest were reviewed. In addition numerous individuals in government and industry were contacted regarding their interest in the program. It was concluded that the development and demonstration of technologies for producing gaseous fuels from biomass should have a high priority in the Northwest. Additional findings of the assessment are included. A detailed program plan was developed which defined the goals, approach, and scope of work necessary for executing a Northwest Regional Biomass Program. The plan is based on the objectives of the Gas Research Institute and those of potential funding partners as well as the energy needs of the Northwest Region. GRA

N83-31894# Braun (C. F.) and Co., Alhambra, Calif.
FOSSIL FUEL GASIFICATION TECHNICAL EVALUATION SERVICES Topical Report, 1978 - 1980
Roger F. Detman 30 Dec. 1982 293 p refs Sponsored by Gas Research Inst., Chicago, Ill.
(PB83-195107; GRI-80/0168) Avail: NTIS HC A13/MF A01 CSCL 07A

The Exxon, Mountain Fuel, Cities Service/Rockwell, Westinghouse, BGC slagging Lurgi and Peatgas processes for fossil fuel gasification were evaluated. The Lurgi and HYGAS processes were evaluated in earlier studies. For producing synthetic natural gas (SNG) from coal, only the Westinghouse conceptual design appeared competitive with HYGAS on eastern coal. All coal gasification processes were competitive with or better than Lurgi on eastern coal. The Mountain Fuel process was more costly than Lurgi or HYGAS on a western coal. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N83-31895* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
BEAM CONNECTOR APPARATUS AND ASSEMBLY Patent
Georg F. vonTiesenhausen, inventor (to NASA) Issued 3 May 1983 6 p Filed 8 Oct. 1980 Supersedes A81-12283 (19 - 03, p 0332)
(NASA-Case-MFS-25134-1; US-Patent-4,381,583;
US-Patent-Appl-SN-195226; US-Patent-Class-24-214;
US-Patent-Class-244-159) Avail: US Patent and Trademark Office CSCL 13I

An apparatus and assembly for connecting beams and like structural members is disclosed which is particularly advantageous for connecting two members which are moved laterally into place. The connector apparatus requires no relative longitudinal movement between the ends of the beams or members being connected to make a connection joint. The apparatus includes a receptacle member and a connector housing carried by opposed ends of the structural member being connected. A spring-loaded connector member is carried by the connector housing which may be released for extension and engagement into the receptacle member.
Official Gazette of the U.S. Patent and Trademark Office

N83-31896* National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD AND APPARATUS FOR PRODUCING GAS-FILLED HOLLOW SPHERES Patent
Taylor G. Wang (JPL, Calif. Inst. of Tech., Pasadena) and Daniel D. Elleman, inventors (to NASA) (JPL, Calif. Inst. of Tech., Pasadena) Issued 17 Aug. 1982 4 p Filed 18 Sep. 1981 Supersedes N82-26461 (20 - 17, p 2381)
(NASA-Case-NPO-14596-3; US-Patent-4,344,787;
US-Patent-Appl-SN-303671; US-Patent-Class-65-214;
US-Patent-Class-65-22; US-Patent-Class-65-142;
US-Patent-Class-264-5; US-Patent-Class-264-9;
US-Patent-Class-425-6) Avail: US Patent and Trademark Office CSCL 13H

A system for forming hollow spheres containing pressured gas is described which includes a cylinder device containing a molten solid material with a nozzle at its end. A second gas nozzle, lying slightly upstream from the tip of the first nozzle, is connected to a source that applies pressured filler gas that is to fill the hollow spheres. High pressure is applied to the molten metal, as by moving a piston within the cylinder device, to force the molten material

out of the first nozzle. At the same time, pressured gas fills the center of the extruded hollow liquid pipe that breaks into hollow spheres. The environment outside the nozzles contains gas at a high pressure such as 100 atmospheres. Gas is supplied to the gas nozzle at a slightly higher pressure such as 101 atmospheres. The pressure applied to the molten material is at a still higher pressure such as 110 atmospheres.
Official Gazette of the U.S. Patent and Trademark Office

N83-31897* National Aeronautics and Space Administration. Pasadena Office, Calif.
CYCLING JOULE THOMSON REFRIGERATOR
Emanuel Tward, inventor (to NASA) (JPL, Calif. Inst. of Tech., Pasadena) 4 Jan. 1983 8 p Filed 28 Jan. 1981 Supersedes N81-19344 (19 - 10, p 1338)
(NASA-Case-NPO-15251-1; US-Patent-4,366,680; US-Patent-Appl-SN-229239; US-Patent-Class-62-514R; US-Patent-Class-62-48; US-Patent-Class-337-14) Avail: US Patent and Trademark Office CSCL 14B

A symmetrical adsorption pump/compressor system having a pair of mirror image legs and a Joule Thomson expander, or valve, interposed between the legs thereof for providing a, efficient refrigeration cycle is described. The system further includes a plurality of gas operational heat switches adapted selectively to transfer heat from a thermal load and to transfer or discharge heat through a heat projector, such as a radiator or the like. The heat switches comprise heat pressurizable chambers adapted for alternate pressurization in response to adsorption and desorption of a pressurizing gas confined therein.
Official Gazette of the U.S. Patent and Trademark Office

N83-31898# Central Electricity Generating Board, London (England).
SAFETY ENGINEERING: KTA CODE OF PRACTICE. LIFTING MECHANISMS IN NUCLEAR PLANT
1983 21 p Transl. into ENGLISH of KTA 3290, 6/78 edition (BLL-CE-Trans-7880-(9022.09)) Avail: British Library Lending Div., Boston Spa, Engl.

Lifting mechanisms safety requirements are discussed in accordance with the present state of development of science and engineering for the protection of life, health, and assets against the dangers of nuclear energy and the ill effects of ionizing radiation. Author

N83-31899# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
FLEXIBLE MANUFACTURING SYSTEM HANDBOOK. VOLUME 1: EXECUTIVE SUMMARY Final Technical Report
Warren, Mich. Army Tank-Automotive Command Research and Development Center Feb. 1983 21 p
(Contract DAAE07-82-C-4040)
(AD-A127927; TACOM-TR-12703-Vol-1; CSDL-R-1599-Vol-1) Avail: NTIS HC A02/MF A01 CSCL 13/8

Flexible Manufacturing Systems (FMSs) represent a relatively new strategy to increase productivity. The technology is especially attractive for manufacturers who produce in the middle ranges of production volumes, neither mass production nor one of a kind. Today's unpredictable market environment demands low-cost solutions that provide quick product start-up, adaptability and responsiveness to changes in demand, and the capacity to easily resurrect out-of-production designs. In many instances, FMSs provide a direct hardware/software solution to this threefold management challenge. The adoption of FMS technology requires that one address many questions beforehand. This handbook provides a methodical approach to answering these questions. But it is not a cookbook; it cannot be. Each application of FMS technology is unique, therefore, the guidelines presented are fairly general. Author (GRA)

N83-31900# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
FLEXIBLE MANUFACTURING SYSTEM HANDBOOK. VOLUME 2: DESCRIPTION OF THE TECHNOLOGY Final Technical Report
Feb. 1983 61 p 5 Vol.
(Contract DAAE07-82-C-4040)
(AD-A127928; TACOM-TR-12703-Vol-2; CSDL-R-1599-Vol-2) Avail: NTIS HC A04/MF A01 CSCL 13/8

This section describes the major elements of an FMS. It begins with a discussion of the principal physical characteristics of a system, including the central elements, the machining stations, the load/unload stations, control station, and cleaning stations. The material handling systems are next considered, followed by a detailed description of the control system. The multitude software functions are then explored in depth. Finally, the remaining significant elements of an FMS are addressed. These include fixtures and pallets, tooling, chip handling, deburring, inspection, and requirements for line personnel. To establish a frame of reference, a description of the operation of an entire system is presented in the following subsection. GRA

N83-31901# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
FLEXIBLE MANUFACTURING SYSTEM HANDBOOK. VOLUME 3: BUYER/USER'S GUIDE Final Technical Report
Feb. 1983 114 p 5 Vol.
(Contract DAAE07-82-C-4040)
(AD-A127929; TACOM-TR-12703-Vol-3; CSDL-R-1599-Vol-3) Avail: NTIS HC A06/MF A01 CSCL 13/8

This is the third volume in a five-volume series designed to serve as a more detailed guide to planners at corporate and plant levels closer to the manufacturing environment. It shows how to specify and purchase an FMS and then deals with installation and operation. Volume 4 contains a sample request-for-proposal, a proposal, a glossary of FMS terms, a bibliography, and other technical material. Volume 5 contains user's manuals for various software packages. Author (GRA)

N83-31902# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
FLEXIBLE MANUFACTURING SYSTEM HANDBOOK. VOLUME 4. APPENDICES Final Technical Report
Feb. 1983 244 p refs 5 Vol.
(Contract DAAE07-82-C-4040)
(AD-A127930; TACOM-TR-12703-Vol-4; CSDL-R-1599-Vol-4) Avail: NTIS HC A12/MF A01 CSCL 13/8

This is the fourth volume in a five-volume series of appendices contains a sample request for proposal, a proposal, a glossary of FMS terms, a bibliography, and other technical material. Volume V contains user's manuals for various software packages. Author (GRA)

N83-31903# Oregon State Univ., Corvallis. Dept. of Civil Engineering.
AN ECONOMIC ANALYSIS OF ALTERNATIVE PAVING MATERIALS M.S. Thesis
Jennifer L. Mustain 6 Dec. 1982 46 p refs
(Contract N66314-70-A-0081)
(AD-A127534) Avail: NTIS HC A03/MF A01 CSCL 13/2

The purpose of this paper is to present a means for economic analysis of alternative equivalent pavement designs, considering such factors as initial construction cost, annual maintenance cost, salvage value and the various intangibles which occur during the analysis period. Having established a means of economic comparison, it is then the intent of this paper to show that Portland Cement Concrete has been and is a viable pavement alternative and ought to receive due consideration in the military construction program. Author (GRA)

N83-31904# Advanced Mechanical Technology, Inc., Newton, Mass.
DESIGN AND DEVELOPMENT TESTING OF AN IMPROVED HIGH-EFFICIENCY WATER HEATER
Andrew D. Vasilakis, Joseph Gerstmann, and Edward A. Vineyard 1983 25 p refs Presented at the ASHRAE Semiann. Meeting, Atlantic City, N.J., 23-27 Jan. 1983
(Contract W-7405-eng-26)
(DE83-006136; CONF-830102-3) Avail: NTIS HC A02/MF A01

A high-efficiency water heater is described which uses a design approach quite different from the conventional center-flue water

heater. While high efficiency was more readily achieved through the use of a powered combustion system, a cost/benefit analysis showed that a natural-draft system is more cost effective for residential water heating. The subsequent improvements in a prototype and the current performance are described. DOE

N83-31905# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Physics.
TECHNOLOGY FOR ENERGY-EFFICIENT BUILDINGS
Arthur H. Rosenfeld Nov. 1982 9 p refs Presented at the 1st US/China Conf. on Energy, Resources and Environment, Beijing, 7-12 Nov. 1982
(Contract DE-AC03-76SF-00098)
(DE83-005927; LBL-15182; CONF-821121-2) Avail: NTIS HC A02/MF A01

New Western buildings use little energy for heating, even compared to current Chinese usage. Research and progress in energy efficiency are summarized and applications to China pointed out, especially in regard to insulation, thermal mass, and improved daylighting. DOE

N83-31906# General Electric Co., St. Petersburg, Fla. Neutron Devices Dept.
INTERNAL MOTION IN HIGH VACUUM SYSTEMS
J. M. Frank 1982 20 p refs Presented at the Am. Vacuum Soc. Meeting, Tampa, Fla., 8-10 Feb. 1982
(Contract DE-AC04-76DP-00656)
(DE83-001417; GEPP-OP-641; CONF-820266-1) Avail: NTIS HC A02/MF A01

Three transfer and positioning mechanisms have been developed for the non-air exposed, multistep processing of components in vacuum chambers. The functions to be performed in all of the systems include ultraviolet/ozone cleaning, vacuum baking, deposition of thin films, and thermocompression sealing of the enclosures. Precise positioning of the components is required during the evaporation and sealing processes. The three methods of transporting and positioning the components were developed to accommodate the design criteria and goals of each individual system. The design philosophy, goals, and operation of the three mechanisms are discussed. DOE

N83-31907# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
THE CHALLENGE FOR METROLOGY IN THE R&D ENVIRONMENT
Chester V. Wells Oct. 1982 16 p Presented at the 1982 Workshop and Symp. of the National Conference of Standards Labs., Gaithersburg, Md., 4-7 Oct. 1982
(Contracts DE-AC02-77Ch-00178; EG-77-C-01-4042)
(DE83-003101; SERI/TP-215-1758; CONF-821028-2) Avail: NTIS HC A02/MF A01

Every research and development (R and D) laboratory and its associated metrology program are a unique combination of factors that shape their relationship and affect the quality of the research measurements. Some factors that impact the challenge to implement an effective metrology program in an R and D environment are identified. Two suggestions are offered toward establishing or improving metrology in the R and D setting: produce a series of statements that form an approach to developing an effective policy regarding research measurement quality and metrology in the R and D environment, and assist in planning for the measurement aspects during research experiment planning and design phases. DOE

N83-31908# Stahlwerke Peine-Salzgitter A.G. (West Germany).
USE OF SLEEVED ROLLS IN A BLOOMING MILL Final Report, Oct. 1981
Guenter Kuhn Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 22 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-042; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5

The use of sleeved rolls in the blooming stand ahead of a continuous semifinishing mill is treated. Two sleeved rolls were produced. One comprises a tough steel arbor and the wear resistant roll sleeve of Cr-Ni-Mo-alloyed spheroidal cast iron with carbide. Both parts were joined together in an unstressed manner by adhesive bonding. Tests show that sleeved rolls can be used in blooming stands, thereby increasing their application possibilities, but porosity in the finishing grooves of the rolls caused during the casting process means that long term behavior can not be assessed. Author (ESA)

N83-31909# Nippon Steel Corp., Tokyo (Japan). Market Development Technical Dept.
DEVELOPMENT OF NARROW GAP WELDING TECHNOLOGY FOR EXTREMELY THICK STEEL
Kaneyuki Imai, Tohru Saito, and Makoto Okumura 1983 52 p refs Transl. into ENGLISH from Seitetsu Kenkyu (Japan), no. 307, 1982 52 p
(PB83-178913) Avail: NTIS HC A04/MF A01 CSCL 13H

In the field of extremely thick steel, various narrow gap welding methods were developed on the basis of former welding methods and are used in practice. It is important to develop and improve automatic narrow gap welding, J edge preparation by gas cutting, the prevention of welding defects, wires for narrow gap welding and so on in order to expand the scope of application of the method. Narrow gap welding technologies are described, based on new concepts developed by Nippon Steel Corporation. GRA

N83-31910# Mitsubishi Heavy-Industries Ltd., Tokyo (Japan). Electric Machine Design Sect.
COMPUTER AIDED DESIGN AND PRODUCTION SYSTEM FOR SEQUENCE CONTROLLERS OF MACHINE TOOLS (MARCS)
Fujio Ito, Akinari Okitomo, Yoshiaki Kanazawa, Itsuo Murata, and Seiko Kuwahara 1983 38 p refs Transl. into ENGLISH from Mitsubishi Juko Gibo (Japan), v. 19, no. 4, 1982 38 p
(PB83-179135) Avail: NTIS HC A03/MF A01 CSCL 13I

A newly developed computer aided design and production system for sequence controllers of machine tools is described in the report. The system has the allowing features: (1) The system can keep and refer the sequence circuit diagram using large scale magnetic discs and magnetic tapes; (2) The system is a man-machine communication system with graphic display and character display; (3) It is possible to design, modify, refer, compare and link the sequence circuits diagram using the system; (4) The system has a plotter terminal which is used to draw the sequence circuit diagram; (5) The system can write out the object program of sequence circuits into ROM using ROM writers. GRA

N83-31911# Drexel Univ., Philadelphia, Pa.
USE OF ACOUSTIC EMISSIONS TO PREDICT GROUND STABILITY Final Report, Oct. 1979 - Oct. 1981
Robert M. Koerner and Arthur E. Lord, Jr. Dec. 1982 172 p refs
(Contract DOT-FH-11-9672)
(PB83-178764; FHWA/RD-82/052) Avail: NTIS HC A08/MF A01 CSCL 08M

The acoustic emission (AE) method of sensing, monitoring and interpreting noises operated by soil and rock movement was utilized in an attempt to relate it to the material's potential instability. Both soil and rock materials were investigated in the laboratory and in the field. In the field both open cut and tunnels were investigated. GRA

N83-31912# Brookhaven National Lab., Upton, N. Y.
POLYMER CONCRETE PATCHING MANUAL Final Report, Sep. 1975 - Jun. 1982
Jack J. Fontana and John Bartholomew Jun. 1982 38 p refs
(Contract DOT-FH-61-80-P-30115)
(PB83-180265; BNL-30364-R; FHWA/IP-82/10) Avail: NTIS HC A03/MF A01 CSCL 13B

The practicality of using polymer concrete to repair deteriorated portland cement concrete bridge decks and pavements was

demonstrated. This manual outlines the procedures for using polymer concrete as a rapid patching material to repair deteriorated concrete. The process technology, materials, equipment, and safety provisions used in manufacturing and placing polymer concrete are discussed. Potential users are informed of the various steps necessary to insure successful field applications of the material. GRA

N83-31913# Electricity Council Research Centre, Capenhurst (England).
DEVELOPMENT OF A PLASMA CARBURIZING PROCESS
M. Booth, M. I. Lees, and A. M. Staines Jul. 1982 27 p refs
(PB83-186692; ERC/M-1592) Avail: NTIS HC A03/MF A01 CSCL 13H

An experimental glow discharge or plasma carburizing apparatus using an anomalous glow discharge created in a methane/hydrogen gas mixture at a pressure in the range 1-25 mbar was developed. Carbon concentration profiles were obtained using the apparatus and compared with similar data for vacuum and with the alternative methods giving a metallurgically superior product and savings in energy and treatment gas. It is indicated that a production glow discharge carburizing system technically feasible and meets criteria such as rapid loading/unloading and the fast heat up required in a commercial system. GRA

N83-31914# Cornell Univ., Ithaca, N. Y. Coll. of Engineering.
COMPUTER-AIDED DESIGN AND FABRICATION OF MOLDS AND COMPUTER CONTROL OF INJECTION MOLDING Progress Report, 1 Oct. 1981 - 30 Nov. 1982
K. K. Wang, S. F. Shen, C. Cohen, C. A. Hieber, and A. I. Isayev 30 Nov. 1982 263 p refs
(Grant NSF MEA-82-00743)
(PB83-187955; NSF/MEA-82017; PR-9) Avail: NTIS HC A12/MF A01 CSCL 13H

Modeling flow in cavity, runner system, and junctures is considered, with emphasis on three areas: (1) filling cavities of variable gap thickness; (2) development of boundary integral method for slow viscous flow in juncture regions; and (3) a procedure for balancing systems. Viscoelastic modeling is addressed as well as two principal approaches to the construction of constitutive equations for polymer melts or concentrated polymer solutions: (1) molecular-network theories, and (2) continuum mechanical theories. Attention is focused on rheology and injection molding of glass filled thermoplastics. Progress is reported on developing a parts operation system which provides a flexible environment in which the user can create more complex geometries based on geometric data files of TIPS-1, a solid geometric modeler. GRA

N83-31915# Pennsylvania State Univ., University Park. Dept. of Mechanical Engineering.
INVESTIGATION OF AXISYMMETRIC BUOYANT TURBULENT DIFFUSION FLAMES: TURBULENCE PROPERTIES AND CONCENTRATIONS OF MAJOR SPECIES
S.-M. Jeng, L. D. Chen, and G. M. Faeth Feb. 1983 74 p refs (Grant NB81-NADA-2044)
(PB83-175612; NBS-GCR-83-422) Avail: NTIS HC A04/MF A01 CSCL 13L

Earlier measurements of mean velocities and temperatures in buoyant, turbulent, axisymmetric methane diffusion flames burning in still air were extended to include measurements of fluctuating velocities and mean species concentrations (CH4, N2, O2, CO2, H2O, CO and H2). These measurements, as well as existing measurements in turbulent propane diffusion flames, were employed to evaluate differential models of the process including: (1) a base k-epsilon-g model where effects of buoyancy are only considered in the governing equations for mean quantities; and (2) an extended k-epsilon-g model where buoyancy is also considered in the governing equations for turbulence quantities. Two methods for determining state relationships (the variation of scalar properties as a function of mixture fraction) used in these models were also evaluated. GRA

N83-31916# National Inst. for Occupational Safety and Health, Cincinnati, Ohio.
IN-DEPTH SURVEY REPORT OF AMERICAN AIRLINES PLATING FACILITY
Vincent D. Mortimer, Jr. 8 Dec. 1982 34 p refs
(PB83-187799) Avail: NTIS HC A03/MF A01 CSCL 06J

An in depth survey was conducted at the American Airlines Maintenance and Engineering Center as part of National Institute for Occupational Safety and Health (NIOSH) study evaluating measures to control occupational health hazards associated with the metal plating industry. This American Airlines plating facility, employing approximately 25 workers, is primarily engaged in plating hard chromium, nickel and cadmium on aircraft engine and landing gear parts. Six tanks were studied, including an electroless nickel tank. Area and personal samples for chromium, nickel, cadmium, and cyanide were collected. Ventilation airflow and tank dimensions were measured and data recorded on plating operations. The relationships between air contaminants emitted, local exhaust ventilation flow rate, tank size, and plating activity were evaluated. GRA

N83-31917# Cambridge Univ. (England). Dept. of Engineering.
EXPERIMENTAL OBSERVATIONS OF SHEAR PATTERNS IN DIRECT SHEAR TESTS
G. Scarpelli and D. M. Wood 1982 15 p refs
(PB83-187351; CUER/D-SOILS-TR-124-1982; ISSN-0309-7439) Avail: NTIS HC A02/MF A01 CSCL 08M

A series of simple experiments were performed using direct shear apparatus in order to study the rupture patterns in sands. Measurements of internal displacements were made by observing with X-rays the positions of lead shot placed in a regular array within the sample. Shear displacement was applied manually and radiographs were taken after each increment of horizontal movement in order to observe the incremental strain field. The sand used was 30/52 Leighton Buzzard sand with a grain size between 0.3mm and 0.5mm. It was concluded that, while caution should be exercised in extrapolating the results of these low stress tests, the results matched some theoretical estimates for the orientation of shear bands. It was suggested that characteristic lengths and thicknessess of shear bands might be related to the average particle size of the sand. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N83-31918* National Aeronautics and Space Administration. Pasadena Office, Calif.
MULTIBEAM SINGLE FREQUENCY SYNTHETIC APERTURE RADAR PROCESSOR FOR IMAGING SEPARATE RANGE SWATHS Patent
Atul Jain, inventor (to NASA) (JPL, Calif. Inst. of Tech., Pasadena) Issued 19 Oct. 1982 10 p Filed 3 Jul. 1980 Supersedes N80-32607 (18 - 23, p 3124)
(NASA-Case-NPO-14525-2; US-Patent-4,355,311; US-Patent-Appl-SN-165910; US-Patent-Class-343-5CM; US-Patent-Class-343-9PS; US-Patent-Class-367-88) Avail: US Patent and Trademark Office CSCL 17I

A single-frequency multibeam synthetic aperture radar for large swath imaging is disclosed. Each beam illuminates a separate "footprint" (i.e., range and azimuth interval). The distinct azimuth intervals for the separate beams produce a distinct Doppler frequency spectrum for each beam. After range correlation of raw data, an optical processor develops image data for the different beams by spatially separating the beams to place each beam of different Doppler frequency spectrum in a different location in the frequency plane as well as the imaging plane of the optical

processor. Selection of a beam for imaging may be made in the frequency plane by adjusting the position of an aperture, or in the image plane by adjusting the position of a slit. The raw data may also be processed in digital form in an analogous manner.

Official Gazette of the U.S. Patent and Trademark Office

N83-31919* National Aeronautics and Space Administration. Pasadena Office, Calif.

SYNCHRONIZED VOLTAGE CONTRAST DISPLAY ANALYSIS SYSTEM Patent

Merrill F. Johnston (JPL, Calif. Inst. of Tech., Pasadena), Alex Shumka (JPL, Calif. Inst. of Tech., Pasadena), Emmett Miller (JPL, Calif. Inst. of Tech., Pasadena), and Kenneth C. Evans, inventors (to NASA) (JPL, Calif. Inst. of Tech., Pasadena) Issued 9 Nov. 1982 12 p Filed 22 Aug. 1980 Supersedes N83-18996 (21 - 09, p 1350)

(NASA-Case-NPO-14567-1; US-Patent-4,358,732; US-Patent-Appl-SN-180230; US-Patent-Class-324-73R; US-Patent-Class-250-311; US-Patent-Class-356-394) Avail: US Patent and Trademark Office CSCL 17B

An apparatus and method for comparing internal voltage potentials of first and second operating electronic components such as large scale integrated circuits (LSI's) in which voltage differentials are visually identifed via an appropriate display means are described. More particularly, in a first embodiment of the invention a first and second scanning electron microscope (SEM) are configured to scan a first and second operating electronic component respectively. The scan pattern of the second SEM is synchronized to that of the first SEM so that both simultaneously scan corresponding portions of the two operating electronic components. Video signals from each SEM corresponding to secondary electron signals generated as a result of a primary electron beam intersecting each operating electronic component in accordance with a predetermined scan pattern are provided to a video mixer and color encoder.

Official Gazette of the U.S. Patent and Trademark Office

N83-31920 Atomic Weapons Research Establishment, Aldermaston (England).

CALCULATION OF THE SHIELDING EFFECT OF SOLID SHELL ENCLOSURES

F. G. L. Garthwaite Apr. 1983 28 p refs

(AWRE-O18/82; BR87846) Copyright. Avail: Issuing Activity

A program which determines the shielding effect of solid-shell enclosures against EMP, which presents results as tables and graphs, is presented. Knowledge of shield permeability and conductivity, the basic model to be used, and the dimensions of the model are required. A standard field pulse is incorporated in the program, but the pulse parameters may be changed by the user. The program plots graphs of the external field pulse, the field pulse within the enclosure and the shielding efficiency.

Author (ESA)

N83-31921 National Physical Lab., Teddington (England). Div. of Information Technology and Computing.

A THEORETICAL MODEL FOR THE SPEECH INPUT DEVICE SID3. PART 1: FILTERS

D. Schofield and D. R. Manning Apr. 1983 21 p refs

(NPL-DITC-20/83-Pt-1; ISSN-0262-3218) Copyright. Avail: Issuing Activity

The characteristics of three bandpass input filters implementing a speech input device used to reduce voice data to standard parameters are described. The bands are 350 to 700 Hz, 700 to 1400 Hz and 1400 to 2800 Hz. Static and dynamic models of the active filters are included. The static behavior of the filters corresponds closely to the model. The time response to simple test signals matches well the 10 msec sampling period.

Author (ESA)

N83-31922 National Physical Lab., Teddington (England). Div. of Information Technology and Computing.

A THEORETICAL MODEL FOR THE SPEECH INPUT DEVICE SMD3. PART 2: CORRELATORS

D. Schofield and D. R. Manning Apr. 1983 22 p refs

(NPL-DITC-21/83-Pt-2; ISSN-0262-3218) Copyright. Avail: Issuing Activity

The correlators which determine the frequency and level of correlation of formats in voiced speech as a part of a speech recognition input device are described. The input to the correlators is filtered in the bands 350 to 700 Hz, 700 to 1400 Hz and 1400 to 2800 Hz. The output from each filter is sampled once every shift-time and the samples are all shifted one place down the 32 element delay line. The shift time is set, so that the total delay is three-quarters of the period of the lowest frequency signal in which it is based. At each sample time the products between the undelayed sample and the m-stage sample are produced. Integrators, peak rectifiers and frequency detectors are also employed. A mathematical modal of the voiced resonance channels is presented. The correlation performed introduces a dependence on the time of sampling which is marginally significant for the measurement of levels of correlation. Final resolution is 16 frequencies per octive and 16 different levels of correlation. Errors in frequency or correlation caused by contaminating signals are discussed.

Author (ESA)

N83-31923 National Physical Lab., Teddington (England). Div. of Information Technology and Computing.

A HARDWARE PREPROCESSOR FOR USE IN SPEECH RECOGNITION: SPEECH INPUT DEVICE SID3

R. E. Renger and D. R. Manning May 1983 28 p refs

(NPL-DITC-22/83; ISSN-0262-3218) Copyright. Avail: Issuing Activity

A device which reduces the amount of data sent to the computer for speech recognition, by extracting from the speech signal the information that conveys the meaning of the speech, all other data being discarded is presented. The design includes signal to noise ratios as low as 10 dB, public telephone frequency bandwidth and unconstrained speech. It produces continuously at its output 64 bits of digital information, which represents the way 16 speech parameters vary. The parameters cover speech quality, voice pitch, resonant frequency, level of resonance and unvoiced spectrum color. The receiving computer must have supporting software containing recognition algorithms adapted to SID3 parameters.

Author (ESA)

N83-31924# Naval Research Lab., Washington, D. C. Transmission Technology Branch.

WIDEBAND HF CHANNEL PROBER: SYSTEM DESCRIPTION Interim Report, Jun. 1978 - Jun. 1982

Leonard S. Wagner, Joseph A. Goldstein, and Eather A. Chapman 9 Mar. 1983 47 p refs

(AD-A127040; NRL-8622) Avail: NTIS HC A03/MF A01 CSCL 17/2

The high-frequency, extended-line-of-sight (HF ELOS) channel, which is planned as the primary intra-task-force communication link, is a multimodal channel involving modes of widely disparate characteristics. The surface-wave mode is relatively broadband, while the sky-wave modes are substantially more limited in bandwidth because of the inherently dispersive character of the ionospheric propagation medium. Environmental factors such as sea state, seawater temperature and salinity, atmospheric-refractive-index vertical profile, and ionospheric conditions all exercise strong influences over the link characteristics. A definitive data base from which to infer the broadband signalling characteristics of the channel is not presently available. The Wideband HF Channel Prober is a very short pulse (1-microsec) HF radio sounder with the necessary sensitivity, time resolution, and processing speed to monitor and record the details of the pulse response of the channel. To exploit fully the average-power capabilities of most high-power transmitters, a coded PM sequence is transmitted rather than a single pulse. The period of the PN sequence is designed to be comparable with the expected reverberation time of the channel. Correlation processing in the receiver results in a processing of gain of the order of 34 dB.

GRA

N83-31925*# American Telephone and Telegraph Co., New York.

CUSTOMER PREMISES SERVICES MARKET DEMAND ASSESS-

MENT 1980 - 2000. VOLUME 1: EXECUTIVE SUMMARY
R. B. Gamble, L. Saporta (Data Industries Corp.), and G. A. Heidenrich May 1983 33 p
(Contract NAS3-22893)
(NASA-CR-168150; NAS 1.26:168150) Avail: NTIS HC A03/MF A01 CSCL 17B

Estimates of market demand for domestic civilian telecommunications services for the years 1980 to 2000 are provided. Overall demand, demand or satellite services, demand for satellite delivered Customer Premises Service (CPS), and demand for 30/20 GHz Customer Premises Services are covered. Emphasis is placed on the CPS market and demand is segmented by market, by service, by user class and by geographic region. Prices for competing services are discussed and the distribution of traffic with respect to distance is estimated. A nationwide traffic distribution model for CPS in terms of demand for CPS traffic and earth stations for each of the major SMSAs in the United States are provided. Author

N83-31926*# International Telephone and Telegraph Corp., Secaucus, N.J.
CUSTOMER PREMISES SERVICES MARKET DEMAND ASSESSMENT 1980 - 2000: VOLUME 2 Final Report
R. B. Gamble, L. Saporta (Data Industries Corp.), and G. A. Heidenrich (INPUT) May 1983 362 p refs 2 Vol.
(Contract NAS3-22893)
(NASA-CR-168151; NAS 1.26:168151) Avail: NTIS HC A16/MF A01 CSCL 17B

Potential customer premises service (CPS), telecommunication services, potential CPS user classes, a primary research survey, comparative economics, market demand forcasts, distance distribution of traffic, segmentation of market demand, and a nationwide traffic distribution model are discussed. Author

N83-31927# Cornell Univ., Ithaca, N. Y. Dept. of Electrical Engineering.
ANALYSIS OF NOAA/ALASKAN MST RADAR DATA Final Report
M. F. Larsen, M. C. Kelley, and D. T. Farley Nov. 1982 64 p refs
(Contract AF-AFOSR-0020-80)
(AD-A127023; AFOSR-83-0236TR) Avail: NTIS HC A04/MF A01 CSCL 17/9

Beginning in 1979 Cornell University was funded for the purpose of analyzing the high time-resolution measurements provided by the Poker Flat VHF Doppler radar. The research emphasized applications of the technique to investigations of synoptic and mesoscale dynamics. The primary research areas included determining the characteristics of mesoscale turbulence in the range of periods from a few hours to several days and determining the extent to which the geostrophic balance condition is satisfied at time scales of a day or less. Author (GRA)

N83-31928# Electro Magnetic Applications, Inc., Albuquerque, N. Mex.
THE EFFECTS OF CORONA AND ANGLE OF ARRIVAL ON THE EMP RESPONSE OF CABLES LYING ON THE SURFACE OF THE EARTH
S. R. Rogers, R. A. Perala, and William Scharf Adelphi, Md. HDL Feb. 1983 84 p refs
(Contract DAAK21-80-C-0004)
(AD-A127060; HDL-CR-83-004-1) Avail: NTIS HC A05/MF A01 CSCL 09/5

This report establishes that corona is not a significant factor in determining the coupling of source-region EMP to long cables positioned on or near the Earth. A parametric comparison is given for the effect of angle of arrival on various lengths of cables exposed to source-region EMP. In addition, these calculations show that worst-case surface cable response is not necessarily caused by the largest peak amplitude incident field. Instead, the response tends to be more directly related to the time integral of the late time portions of the incident electric field. GRA

N83-31929# Naval Air Development Center, Warminster, Pa. Communication Navigation Technology Directorate.
MULTIFUNCTION SPREAD SPECTRUM TECHNOLOGY Final Report
Yau-Foon Lui 4 Oct. 1982 108 p
(AD-A127045; NADC-82188-40) Avail: NTIS HC A06/MF A01 CSCL 17/2

The techniques for developing a multifunction modulator/demodulator for processing spread spectrum waveforms are investigated. Based on a trade-off analysis of techniques such as CCDs, SAWs, digital and optical correlators, the best technical approach is determined. Author (GRA)

N83-31930# Naval Underwater Systems Center, New London, Conn.
ELF PVS FIELD STRENGTH MEASUREMENTS, OCTOBER 1977
Peter R. Bannister 3 Feb. 1983 108 p refs
(X0792SB)
(AD-A128196; NUSC-TR-6773) Avail: NTIS HC A06/MF A01 CSCL 20/14

From September 1976 to December 1978, extremely low frequency (ELF) field-strength and effective-noise measurements were taken aboard operational submarines. The results of measurements taken in Connecticut and aboard two submarines during October 1977 are discussed. The principal test result is that the average field strengths measured aboard the two submarines (one located in the North Atlantic and one located in the Western Pacific) are in excellent agreement with previous ELF measurements taken over similar paths. Author (GRA)

N83-31931# Ohio State Univ., Columbus. Electroscience Lab.
NEAR FIELD ANALYSIS OF AIRBORNE ANTENNA Final Report
Nan Wang and W. D. Burnside Mar. 1983 35 p refs
(Contract N00019-81-C-0424)
(AD-A127246; ESL-714215-4) Avail: NTIS HC A03/MF A01 CSCL 09/5

The radiation pattern analysis for the ellipsoid based on the efficient UTD and geodesic solution has been completed. This new ellipsoid configuration will be used to represent the fuselage in future aircraft simulation analyses. Author (GRA)

N83-31932# Michigan Univ., Ann Arbor. Radiation Lab.
ELECTROMAGNETIC SCATTERING Final Report, 1 Jan. - 31 Dec. 1982
Thomas B. A. Senior Jan. 1983 11 p
(Grant AF-AFOSR-0112-82; AF Proj. 2304)
(AD-A127899; AFOSR-83-0336TR; Rept-019651-1-F) Avail: NTIS HC A02/MF A01 CSCL 20/6

This report summarizes research results produced by the investigator under support of the Air Force grant. The work has been mainly concerned with the scattering of electromagnetic waves by bounded bodies of small electrical dimensions, but with some consideration also of acoustic scattering by soft, hard and homogeneous penetrable shapes. GRA

N83-31933# Rome Air Development Center, Griffiss AFB, N.Y. Electromagnetic Sciences Div.
BACKSCATTERING FROM ANISOTROPIC RANDOM MEDIA
Stanford P. Yukon Nov. 1982 85 p refs
(AF Proj. 4600)
(AD-A127873; RADC-TR-82-287) Avail: NTIS HC A05/MF A01 CSCL 12/1

The cross section for backscattering from an anisotropic random dielectric medium is computed for the case where the wavelength is much smaller than the outer scale length of the medium and where the path length through the medium can be many times the mean free path for small-angle forward scattering. The cross section as a function of K sub i and K sub f, the initial and final wavevectors, is obtained by an extension of the cumulative forward-scatter single-backscatter calculation of DeWolf. The cross section for the general case is computed by expanding the

general expression for the cross section in terms of path dependent correlation functions using Kubo's cumulant expansion method. Evaluation of the resulting Fourier transform is achieved by a functional Taylor Series expansion in terms of multiple convolutions of the projected correlation functions. Numerical results are obtained for the case of a Gaussian correlation function and a method is presented for calculating the cross section for the Kolmogoroff spectrum. Author (GRA)

N83-31934# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
A POST-PROCESSING ALGORITHM FOR TIME DOMAIN PITCH TRACKERS Interim Report
Philippe Specker 21 Jan. 1983 22 p refs
(Contract F33615-78-C-1551; Grant NSF MCS-78-25824; DARPA Order 3597)
(AD-A127671; CMU-CS-83-104) Avail: NTIS HC A02/MF A01 CSCL 17/2

This paper describes a powerful post-processing algorithm for time-domain pitch trackers. On two successive passes, the post-processing algorithm eliminates errors produced during a first pass by a time-domain pitch tracker. During the second pass, incorrect pitch values are detected as outliers by computing the distribution of values over a sliding 80 msec window. During the third pass (based on artificial intelligence techniques), remaining pitch pulses are used as anchor points to reconstruct the pitch train from the original waveform. The algorithm produced a decrease in the error rate from 21% obtained with the original time domain pitch tracker to 2% for isolated words and sentences produced in an office environment by 3 male and 3 female talkers. In a noisy computer room errors decreased from 52% to 2.9% for the same stimuli produced by 2 male talkers. The algorithm is efficient, accurate, and resistant to noise. The fundamental frequency micro-structure is tracked sufficiently well to be used in extracting phonetic features in a feature-based recognition system. Author (GRA)

N83-31935# Decisions and Designs, Inc., McLean, Va.
DEVELOPMENT OF TELECONFERENCING METHODOLOGIES WITH EMPHASIS ON VIRTUAL SPACE VIDEO AND INTERACTIVE GRAPHICS Final Technical Report
Linda B. Allardyce and L. Scott Randall Apr. 1983 98 p
(Contract MDA903-80-C-0193; DARPA Order 3853)
(AD-A127738; DDI/TR-83-4-314.73) Avail: NTIS HC A05/MF A01 CSCL 17/2

This final report completes three years of research effort conducted by Decisions and Designs, Inc. (DDI) to investigate and implement a prototype video/audio teleconferencing system. This project has included everything from feasibility studies through the transfer of technology to an operational system. The most striking outcome of this research has been the development of an interactive videographic subsystem, which has been called the Shared Graphic Workspace (SGWS). By using the SGWS, conferees have the ability to share documents or other visual materials during a teleconference, and annotate the graphic materials if so desired. In addition, this research incorporated a video coder/decoder (codec), which was developed by Compression Labs., Inc. (CLI), to test the effectiveness of severely compressed video images of conferees in various types of teleconference environments. Use of these codecs indicated that even a severely compressed picture is a definite improvement over audio-only conferencing. Two other significant aspects of this research project were: implementing the virtual space concept (for multiple transmissions of each conferee's image), and developing a user interface suitable for high level decision makers. GRA

N83-31936# Naval Postgraduate School, Monterey, Calif. Dept. of Physics.
COHERENCE STUDIES OF GEOMAGNETIC FLUCTUATIONS IN THE FREQUENCY RANGE .05 TO 10 Hz M.S. Thesis
Joseph Timothy Fisher Dec. 1982 171 p refs
(AD-A127708) Avail: NTIS HC A08/MF A01 CSCL 08/14

Fluctuations in the horizontal component of the Earth's magnetic field were measured at a land site (La Mesa) and on the floor of Monterey Bay at a depth of 70 meters. The measurements span a 19-hour period (August 17/18, 1982). Assuming a circular polarization basis set, analysis was conducted to determine the coherence between the two sites in the frequency range .05-10 Hz. Preliminary analysis indicates a high degree of coherence from .05-.4 Hz. Also, a study of the polarization of the micropulsation field at each site was conducted in terms of Stokes parameters. Author (GRA)

N83-31937# Mitre Corp., Bedford, Mass.
CLUTTER PROCESSING OF SEEK IGLOO: A MODERN LONG RANGE 3-D RADAR
R. C. Smith Hanscom AFB, Mass. ESD Apr. 1983 21 p refs
(Contract F19628-82-C-0001)
(AD-A127520; ESD-TR-83-123; M82-59) Avail: NTIS HC A02/MF A01 CSCL 17/9

The radar is being developed to replace the outmoded and expensive to maintain AN/FPS-93 and AN/FPS-90 radars now used in Alaska. The AN/FPS-93 is a two-dimensional surveillance radar and the AN/FPS-90 is a two-dimensional height finder radar; both of these older radars have been in operation since the early 1950's. The specification requirements for SEEK IGL00 were set by a combination of the following: (1) performance characteristics of the AN/FPS-90 and AN/FPS-93 radars; (2) performance characteristics of the Semi-Automatic Ground Environment (SAGE) System and the Joint Surveillance System (JSS); (3) sensor requirements using the new generation fighter aircraft; and (4) stringent reliability, maintainability and availability requirements to reduce on-site maintenance and operations personnel. The SEEK IGLOO radar will provide digital output messages (as opposed to the conventional 'blip' signals used with many radar displays) containing range, azimuth and height information for radar and beacon targets. GRA

N83-31938# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Engineering Physics.
ELECTROMAGNETIC MIRROR DYNAMICS M.S. Thesis
Richard K. Hill Dec. 1982 86 p refs
(AD-A127515; AFIT/GEP/PH/82D-13) Avail: NTIS HC A05/MF A01 CSCL 20/7

The phenomena of resonant radiation pressure is studied as it applies to the reflection of two-level atoms from an evanescent wave. The basic mechanism is examined in detail. Three applications are proposed, analyzed, and compared to existing methods of neutral beam control. The first application is a beam conducting pipe which can contain and decelerate a beam of atoms. The second application is a parabolic nozzle which can collimate and focus a beam three orders of magnitude better than comparable resonant focusing. The third application is a macroscopic trap for slow atoms which allows laser-free observation of -100 cm/s atoms for times measured in seconds. A computer code which tracks atomic trajectories through multiple reflections is included. Author (GRA)

N83-31939# Pattern Analysis and Recognition Corp., New Hartford, N.Y.
MODEM SIGNATURE ANALYSIS Final Technical Report, Sep. 1980 - Nov. 1981
Thomas V. Edwards, James W. Modestino, Michael B. Koligman, Robert J. Dick, and Curry M. Bartlett Griffiss AFB, N.Y. RADC Oct. 1982 249 p refs
(Contract F30602-80-C-0264; AF Proj. 2305)
(AD-A127993; RADC-TR-82-269) Avail: NTIS HC A11/MF A01 CSCL 17/2

The objective of this effort was to theoretically and experimentally investigate the use of modem signature analysis techniques for in-service channel-quality monitoring of voice bandwidth channels used for digital transmission. 'Modem Signatures' is a term applied to any characteristic derived from the signal source by measurement or transformation (FFT, for example) for use by a generalized algorithm. Monitoring refers to the determination of the transmission channel condition and, ideally, to the identification

of the type and degree of impairments affecting the channel, to aid the operator in effectively managing available resources (channels) and maximizing up-time. Throughout the course of this effort, algorithms effective in the monitoring of in-service voice frequency data lines were developed and demonstrated. A hierarchial approach to performance monitoring was presented and implemented in the form of a demonstration software system. Through demonstration, it was shown that reliable performance monitoring can be achieved for 1200 and 2400 bits/second modems. Not only could the type of impairment be recognized from among Gaussian noise, odd harmonic distortion and phase jitter, but the degree of the impairment was also indicated. GRA

N83-31940# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.

NAVAL COMMUNICATIONS PROCESSING AND ROUTING SYSTEM (NAVCOMPARS): A MODEL FOR BROADCAST PERFORMANCE ANALYSIS M.S. Thesis

Gary L. George Mar. 1983 53 p refs

(AD-A127990) Avail: NTIS HC A04/MF A01 CSCL 17/2

This thesis represents an analysis of the performance of the Naval Telecommunications System's (NTS) multichannel broadcast. It highlights the speed differential between the Naval Communications Processing and Routing System's (NAVCOMPARS) processing subsystems and the multichannel broadcast's transmission lines. In this effort, the message flow through the NAVCOMPARS is described. An analytic approach was chosen and input statistics, such as average message length and input rates, were gathered for queuing analysis. The operational characteristic upon which broadcast performance is evaluated is the average time delay in the system. The broadcast channel's ability to satisfy future communications requirements is also examined. The analysis demonstrates that, unless the increasing trends in message input rates are reversed of message lengths reduced, a dedicated broadcast overload channel would be required to meet communications requirements throughout the 1980's. Author (GRA)

N83-31941# Naval Research Lab., Washington, D. C. Communications Systems Engineering Branch.

CONTROLLED TEST PROCEDURES FOR USING INTERVOCALIC CONSONAUTS TO ASSESS SPEECH INTELLIGIBILITY: A FEASIBILITY STUDY Interim Report

Astrid Schmidt-Nielsen 27 Apr. 1983 23 p refs

(RR0210542)

(AD-A127953; NRL-8676) Avail: NTIS HC A02/MF A01 CSCL 14/2

A preliminary version of an intelligibility test based on intervocalic consonant excised from connected speech was developed and compared with the Diagnostic Rhyme Test (DRT), which is based on initial consonants of syllables spoken in isolation. The intervocalic consonants showed different patterns of losses than the DRT when the speech was processed through four digital voice processors. Intelligibility losses under conditions of noise and low-pass filtering were also investigated. Author (GRA)

N83-31942# Naval Underwater Systems Center, New London, Conn.

ELF (EXTREMELY LOW FREQUENCY) PVS (PROPAGATION VALIDATION SYSTEM) FIELD STRENGTH MEASUREMENTS, JANUARY 1977

Peter R. Bannister 21 Mar. 1983 74 p refs

(AD-A128265; NUSC-TR-6879) Avail: NTIS HC A04/MF A01 CSCL 20/14

From September 1976 to December 1978, extremely low frequency (ELF) field-strength and effective-noise measurements were taken aboard operational submarines. The results of measurements taken aboard three different submarines during January 1977 are discussed in this report. The principal result is that the average measured field-strength and relative-phase values are in excellent agreement with the predicted values that are based on simultaneous measurements taken in Connecticut. Author (GRA)

N83-31943# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Electrical Computer and Systems Engineering.

DIGITAL COMMUNICATIONS IN SPATIALLY DISTRIBUTED INTERFERENCE CHANNELS Final Technical Report, 1 Jul. 1980 - 31 Mar. 1981

J. W. Modestino, D. C. Daut, V. M. Eyuboglu, K. Y. Jung, K. R. Mathis, and A. Y. Ningo Griffiss AFB, N.Y. RADC Dec. 1982 215 p refs

(Contract F30602-78-C-0083; AF Proj. 2305)

(AD-A127741; RADC-TR-82-151) Avail: NTIS HC A10/MF A01 CSCL 17/2

This report is concerned with the characterization of the structure and performance of digital communication systems operating in spatially distributed interference channels when a multi-element array processing capability is available. It represents one phase of a continuing investigation and covers the period 1 July, 1980 through 31 March, 1981. This report is organized into five parts. Part 1 describes an optimum receiver when a multi-element array capability is available and under specific and somewhat simplified modeling assumptions. The results are useful in demonstrating the subtle interactions between spatial and temporal processing characteristics of an optimum receiver, particularly the modulation/coding tradeoffs. Part 2 discusses some new reduced complexity soft-decision decoding algorithms for linear block codes while Part 3 describes some new rational-rate convolutional code constructions. Both of these should be useful in impulsive or burst interference environments. In Part 4 we describe some results on the modeling and analysis of selected linear and nonlinear receiver structures in impulsive or burst noise channels. Finally, an outline of how multi-element adaptive array processing structures are to be incorporated into the RPI developed Interactive Communications Simulator (ICS) is provided in Part 5. GRA

N83-31944# Naval Postgraduate School, Monterey, Calif. Dept. of Systems Technology.

SOME EFFECTS OF STRESS ON USERS OF A VOICE RECOGNITION SYSTEM: A PRELIMINARY INQUIRY M.S. Thesis

Brian Arthur French Mar. 1983 75 p refs

(AD-A128559) Avail: NTIS HC A04/MF A01 CSCL 05/10

Recent work with Automatic Speech Recognition has focused on applications and productivity considerations in the man-machine interface. This thesis is an attempt to see if placing users of such equipment under time-induced stress has an effect on their percent correct recognition rates. Subjects were given a message-handling task of fixed length and allowed progressively shorter times to attempt to complete it. Questionnaire responses indicate stress levels increased with decreased time-allowance; recognition rates decreased as time was reduced. Author (GRA)

N83-31945# SRI International Corp., Menlo Park, Calif.

SOUTHWEST PAVE PAWS RADAR SYSTEM: ENVIRONMENTAL ASSESSMENT Final Report, Nov. 1981 - Mar. 1983

Sidney J. Everett, William A. Edson, Louis N. Heynick, Steven R. Pierce, Richard A. Shepherd, and Tracy H. Wlaklet Mar. 1983 370 p refs

(Contract F33615-82-C-0604)

(AD-A128554; SAM-TR-83-13) Avail: NTIS HC A16/MF A01 CSCL 17/9

This document describes the probable environmental impacts of constructing and operating a new surveillance and tracking radar that would operate between 420 and 450 MHz. Four candidate sites in the vicinity of Goodfellow Air Force Base were considered. The impact analysis found that chronic exposure of humans to the radiofrequency radiation levels outside the exclusion fence is not likely to be harmful. No hazards would be associated with fuel handling or cardiac pacemakers at ground level beyond the exclusion fence. Interference with TV reception and other home electronic systems and with UHF land mobile and amateur radios is possible, depending on the site. Handling and use of electroexplosive devices (EEDs) would be safe beyond about 1.2 miles for the basic system and about 2.4 miles for the optional, higher power system. Electromagnetic interference with radar altimeters,

air navigation, and air-ground communication is not likely except at two candidate sites, where interference and EED and pacemaker hazards may exist for aircraft operating into or out of a nearby landing strip. No significant adverse biophysical impacts are expected in any location. GRA

N83-31946# Naval Postgraduate School, Monterey, Calif. Dept. of Systems Technology.

A PRELIMINARY ANALYSIS OF HUMAN FACTORS AFFECTING THE RECOGNITION ACCURACY OF A DISCRETE WORD RECOGNIZER FOR C3 SYSTEMS M.S. Thesis

Howard William Yellen Mar. 1983 191 p refs

(AD-A128546) Avail: NTIS HC A09/MF A01 CSCL 17/2

Literature pertaining to Voice Recognition abounds with information relevant to the assessment of transitory speech recognition devices. In the past, engineering requirements have dictated the path this technology followed. But, other factors do exist that influence recognition accuracy. This thesis explores the impact of Human Factors on the successful recognition of speech, principally addressing the differences or variability among users. A Threshold Technology T-600 was used for a 100 utterance vocubalary to test 44 subjects. A statistical analysis was conducted on 5 generic categories of Human Factors: Occupational, Operational, Psychological, Physiological and Personal. How the equipment is trained and the experience level of the speaker were found to be key characteristics influencing recognition accuracy. To a lesser extent computer experience, time or week, accent, vital capacity and rate of air flow, speaker cooperativeness and anxiety were found to affect overall error rates. GRA

N83-31947# Naval Postgraduate School, Monterey, Calif. Dept. of Electrical Engineering.

A TIME SLOT ASSIGNMENT ALGORITHM FOR A TDMA PACKET RADIO NETWORK M.S. Thesis

William Karl Tritchler Mar. 1983 156 p refs

(AD-A128545) Avail: NTIS HC A08/MF A01 CSCL 17/2

An algorithm for the assignment of time slots within a Time Division Multiple Access (TDMA) scheme for an integrated voice and packet radio network is implemented in, and studied by, a computer simulation. The slot assignment scheme is applied both to a static network, where 'best path' routes are held constant, and also to a network where the 'best path' routes are permitted to change dynamically during the simulation as communications capability at various nodes approaches saturation. The Dijkstra algorithm is used to determine and modify 'shortest distance' routes, and the sensitivity of performance to various parameters used in defining the link 'distance function' is investigated. The major conclusion is that it is possible to route in a way that reduces the average energy transmitted per message without substantially decreasing the network throughput. Author (GRA)

N83-31948# Connecticut Univ., Storrs. Dept. of Electrical Engineering and Computer Science.

A COLLISION RESOLUTION PROTOCOL WITH LIMITED CHANNEL SENSING: FINITELY MANY USERS

P. Papantoni-Kazakos, Glenn D. Marcus, and Michael Georgiopoulos Feb. 1983 46 p refs

(Grant AF-AFOSR-3695-78; AF Proj. 2304)

(AD-A128501; EECS-TR-83-2; AFOSR-83-0419TR) Avail: NTIS HC A03/MF A01 CSCL 17/2

In this paper, the authors consider the random-accessing of a single slotted channel by a finite number of independent, data transmitting bursty users. They adopt the assumption that each user monitors the channel only while he is blocked. They also assume that the channel outcomes (visible to each user) are ternary. That is, each channel slot is perceived as either empty or successfully busy, or as a collision slot. Propagation delays are disregarded. For the above model, the authors propose and analyze a collision resolution protocol (CRLS) with tree search characteristics. For identical users with binomial transmission processes, they find lower bounds on the CRLS throughput, and compute upper bounds on the induced delays in transmission. Their results are compared with those induced by the dynamic tree protocol of Capetanakis; where the feedback sensing is continuous in the latter. The CRLS performs surprisingly well. For asymptotically many users, its throughput is higher than the throughput of the non-dynamic tree protocol of Capetanakis, and less than 7 percent lower than the throughput of the dynamic form of the latter. The CRLS also compares well in terms of delays, and it is robust in the presence of channel errors. GRA

N83-31949# California Univ., Livermore. Lawrence Livermore Lab.

THREE-DIMENSIONAL COMPUTER MODELING OF ELECTROMAGNETIC FIELDS: A GLOBAL-LOOKBACK LATTICE-TRUNCATION SCHEME

R. W. Ziolkowski, N. K. Madsen, and R. C. Carpenter Oct. 1982 73 p refs Presented at the Joint Intern. IEEE/APS Symp., Natl. Radio Sci. Meeting, and Nucl. Electromagnetic Pulse Meeting, Albuquerque, N. Mex., 24-28 May 1982

(Contract W-7405-eng-48)

(DE83-006583; UCRL-87201-Rev-1; CONF-820511-2-Rev-1) Avail: NTIS HC A04/MF A01

A lattice truncation scheme for the finite difference time domain approach to the solution of Maxwell's equations was developed. The problem space is truncated near the sources and the field components on its boundary are generated from those field values known at retarded times on an interior surface one call from it with an integral representation of the electromagnetic field. The numerical implementation of this global lookback scheme is discussed. Examples which were used to determine its characteristics and its validity are given. DOE

N83-31950# California Univ., Livermore. Lawrence Livermore Lab.

DECONVOLUTION OF NOISY TRANSIENT SIGNALS: A KALMAN FILTERING APPLICATION

J. V. Candy and J. E. Zicker Aug. 1982 6 p refs Presented at the 21st Inst. of Elec. and Electron. Engr. Conf. Decision and Control, Orlando, Fla., 8-10 Dec. 1982

(Contract W-7405-eng-48)

(DE83-030849; UCRL-87432; CONF-821206-1) Avail: NTIS HC A02/MF A01

The deconvolution of the transient signals from noisy measurements is a common problem. The transient deconvolution problem places atypical constraints on algorithms presently available. The Schmidt-Kalman filter, a time varying, tunable predictor, is designed using a piecewise constant model of the transient input signal. A simulation is developed to test the algorithm for various input signal bandwidths and different signal to noise ratios for the input and output sequences. The algorithm performance is reasonable. DOE

N83-31951# Fermi National Accelerator Lab., Batavia, Ill.

HIGH ENERGY ELECTROMAGNETIC SHOWER POSITION MEASUREMENT BY A FINE GRAINED SCINTILLATION HODOSCOPE

B. Cox, G. Hale, P. O. Mazur, R. L. Wagner, D. E. Wagoner, H. Areti, S. Conetti, P. Lebrun, T. Ryan, and R. A. Gearhart Oct. 1982 8 p refs Presented at the IEEE Nucl. Sci. Symp., Washington, D.C., 20-22 Oct. 1982 Prepared in cooperation with McGill Univ., Montreal and Stanford Linear Accelerator Center, Calif.

(Contract DE-AC02-76CH-03000)

(DE83-000082; FERMILAB-CONF-82/76-EXP; CONF-821011-20) Avail: NTIS HC A02/MF A01

The centroids of high energy electromagnetic showers initiated by positrons in the energy range 2 to 17.5 GeV were measured with a fine grained scintillation hodoscope composed of seven 1 cm wide elements placed behind a 3.6 radiation length (15 cm) converter composed of SCG1-C scintillation glass. A simple first moment calculation using the ionization observed in each element of this hodoscope yields a shower position resolution as a function of energy of: sigma (mm) approx 0.7+-5.6/square root of e(GeV). Results on the energy dependence of the shower profiles

and the ionization measured by this hodoscope are presented.
DOE

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N83-31952* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
GYROTRON TRANSMITTING TUBE Patent
Henry G. Kosmahl, inventor (to NASA) Issued 26 Jul. 1983 4 p Filed 24 Dec. 1980 Supersedes N81-16384 (19 - 07 p 0907)
(NASA-Case-LEW-13429-1; US-Patent-4,395,656;
US-Patent-Appl-SN-220212; US-Patent-Class-315-4;
US-Patent-Class-315-3; US-Patent-Class-315-5;
US-Patent-Class-315-5.35; US-Patent-Class-315-5.38) Avail: US Patent and Trademark Office CSCL 09A

An RF transmitting tube for the 20 GHz to 500 GHz range comprises a gyrotron and a multistage depressed collector. A winding provides a magnetic field which acts on spent, spinning or orbiting electrons changing their motion to substantially forward linear motion in a downstream direction. The spent electrons then pass through a focusser into the collector. Nearly all of the electrons injected into the collector will remain within an imaginary envelope as they travel forward toward the end collector plate. The apertures in the collector plates are at least as large in diameter as the envelope at any particular axial position.
Official Gazette of the U.S. Patent and Trademark Office

N83-31953* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ADAPTIVE REFERENCE VOLTAGE GENERATOR FOR FIRING ANGLE CONTROL OF LINE-COMMUTATED INVERTERS Patent
Carlisle R. Dolland, inventor (to NASA) (Garrett Corp., Torrance, Calif.) 19 Jul. 1983 8 p Filed 7 Aug. 1981 Supersedes N81-31481 (19 - 22, p 3057) Sponsored by NASA
(NASA-Case-MFS-25215-1; US-Patent-4,394,610;
US-Patent-Appl-SN-291131; US-Patent-Class-318-803;
US-Patent-Class-318-809; US-Patent-Class-318-800) Avail: US Patent and Trademark Office CSCL 09C

A control system for a permanent-magnet motor driven by a multiphase line-commulated inverter is described. It is provided with integrators for integrating the back EMF of each phase of the motor for use in generating system control signals for an inverter gate logic using a sync and firing angle control generator connected to the outputs of the integrators. The firing angle control signals are produced by the control generator by means for combining 120 deg segments of the integrated back EMF signals symmetrical about their maxima into composite positive and negative waveforms, and means for sampling the maxima of each waveform every 120 deg. These samples are then used as positive and negative firing angle control signals. Whereby any change in amplitude of the integrated back EMF signals will not affect a change in the operating power factor of the motor and inverter.
Official Gazette of the U.S. Patent and Trademark Office

N83-31954* National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD AND DEVICE FOR DETECTION OF A SUBSTANCE Patent
Line C. Yang, inventor (to NASA) (JPL, Calif. Inst. of Tech., Pasadena) Issued 6 Jul. 1982 12 p Filed 20 Mar. 1980 Supersedes N80-21723 (18 - 12, p 1582)
(NASA-Case-NPO-14940-1; US-Patent-4,338,568;
US-Patent-Appl-SN-135038; US-Patent-Class-324-466;
US-Patent-Class-73-861.05) Avail: US Patent and Trademark Office CSCL 09C

A device is disclosed in which a discharge grid is provided that has a sufficiently high voltage potential across its grid electrodes so that a substance with predetermined characteristics causes an electric spark discharge to occur between electrodes. The electric spark discharge alters the predetermined characteristics of the substance by oxidation and/or vaporization so that the substance is no longer detectable by an electric spark discharge. A means is provided for counting the number of electric spark discharges. This count indicates the concentration of the substance having the predetermined characteristics. One embodiment disclosed detects longitudinally extending carbon fibers suspended in a gaseous medium. Another embodiment provides for the detection of carbon fibers adhesively attached to a collection tape. The tape is positioned against the discharge grid and a high voltage is periodically applied across the grid electrodes until electric spark discharges no longer occur.
Official Gazette of the U.S. Patent and Trademark Office

N83-31955 National Physical Lab., Teddington (England). Div. of Electrical Science.
ELECTROMAGNETIC STIRRED MODE CAVITIES (SMCS)
R. N. Clarke Aug. 1982 45 p refs
(NPL-DES-75; ISSN-0143-7305) Copyright. Avail: Issuing Activity

The basic theory of operation of stirred mode cavities and their application to electromagnetic metrology are discussed. The areas covered include power measurements, dosimetry, electromagnetic compatibility, and dielectric measurements. M.G.

N83-31956*# National Aeronautics and Space Administration, Washington, D. C.
A METHOD FOR MAKING AN ALKALINE BATTERY ELECTRODE PLATE
Koshiburo Chida and Tadashi Ezaki May 1983 7 p Transl. into ENGLISH of Japanese Patent no. 56-41150 (26 Sep. 1981) p 139-140 Transl. by Scientific Translations Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-77249; NAS 1.15:77249) Avail: NTIS HC A02/MF A01 CSCL 09A

A method is described for making an alkaline battery electrode plate where the desired active substances are filled into a nickel foam substrate. In this substrate an electrolytic oxidation reduction occurs in an alkaline solution containing lithium hydroxide. Author

N83-31957*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AMBIENT AND CRYOGENIC TEMPERATURE TESTING OF A 32-CHANNEL CMOS MULTIPLEXER
J. H. Lee Jul. 1983 74 p refs
(NASA-TM-84385; A-9414; NAS 1.15:84385) Avail: NTIS HC A04/MF A01 CSCL 09C

A 32 channel CMOS multiplexer was tested at room temperature and at liquid helium temperature (4.9 K). Voltage gain of the FET input stage, leakage current, electrical crosstalk, and noise as a function of clock frequency were measured. The voltage gain measured at 4.9 K was slightly higher than that measured at 300 K and was independent of clock frequency at both operating temperatures. The off channel leakage current was 0.23 pA/channel at 4.9 K. Electrical crosstalk between adjacent channels (one on, one off) was quite low. The spot noise at 10 Hz, of the CMOS multiplexer operating in the static mode did not vary significantly with operating temperature. In the dynamic mode (3.2 kHz clock) at room temperature, the spot noise at 10 Hz was substantially higher than that measured in the static mode.
S.L.

N83-31958# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
FAULT DIAGNOSIS OF NONLINEAR ANALOG CIRCUITS, VOLUME 5. HAFDIC: A PROGRAM FOR GENERATING A HARD

FAULT DICTIONARY
Y. S. Elcherif and P. M. Lin Apr. 1983 79 p refs
(Contract N00014-81-K-0323)
(AD-A127021) Avail: NTIS HC A05/MF A01 CSCL 09/5

This volume contains the user's guide and the listing of HAFDIC, a program for generating hard fault dictionary for nonlinear analog circuits. The theoretical foundation for this program was described in two previous volumes of the report entitled Fault Diagnosis of Nonlinear Analog Circuits: Vol. 1. DC Diagnosis of Hard Failures, P.M. Lin and Y.S. Elcherif, July 1982 and Vol. 4 An Isolation Algorithm for the Analog Fault Dictionary, Y.S. Elcherif and P.M. Lin, April 1983. Author (GRA)

N83-31959# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
FAULT DIAGNOSIS OF NONLINEAR ANALOG CIRCUITS. VOLUME 4: AN ISOLATION ALGORITHM FOR THE ANALOG FAULT DICTIONARY
Y. S. Elcherif and P. M. Lin Apr. 1983 58 p refs
(Contract N00014-81-K-0323)
(AD-A127020) Avail: NTIS HC A04/MF A01 CSCL 09/5

A new approach for fault location in an analog fault dictionary has been adopted on the basis of quantizing circuit responses. The possibility of quantization is offered by faults having nearly the same effect on some test measurements. This produces multivalued logic responses which can be manipulated logically to obtain decision rules for fault location. A logical isolation algorithm has been introduced to form a dictionary for hard fault diagnosis using d.c. voltage measurements. The dictionary consists of tables containing voltage ranges of quantized response and numerical codes identifying different faults inthe dictionary. The test measurements chosen by the algorithm are free from redundancy and provide the maximum fault isolation capability of all initially chosen measurements. The algorithm can be easily implemented with some extra software added to the circuit simulator used in fault simulation. Hardware implementation of a logical isolation ATE is simple and efficient compared to a least squares based dictionary. The algorithm has been extended to handle multiple test input conditions. Author (GRA)

N83-31960# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
FAULT DIAGNOSIS OF NONLINEAR ANALOG CIRCUITS. VOLUME 3: FAULT DIAGNOSIS IN THE TABLEAU CONTEXT Final Report
Larry Rapisarda and R. DeCarlo Apr. 1983 73 p refs
(Contract N00014-81-K-0323)
(AD-A127019) Avail: NTIS HC A04/MF A01 CSCL 09/5

This report details a multifrequency tableau approach for the fault diagnosis of analog linear circuits and systems. The approach utilizes a modified Newton-Raphson solution algorithm to solve a nonlinear (often quadratic) set of tableau equations which characterize the parameters to be identified for the purposes of fault diagnosis. The theory and algorithm are applied to the fault diagnosis of a video amplifier circuit. Author (GRA)

N83-31961# Stanford Univ., Calif. Dept. of Computer Science.
RESEARCH IN VLSI SYSTEMS. HEURISTIC PROGRAMMING PROJECT AND VLSI THEORY PROJECT: A FAST TURN AROUND FACILITY FOR VERY LARGE SCALE INTEGRATION (VLSI) Technical Status Report, Nov. 1982 - Apr. 1983
J. Hennessy, T. Kallath, E. A. Feigenbaum, B. G. Buchanan, J. D. Ullman, and J. T. Meindl Apr. 1983 20 p refs
(Contracts MDA903-79-C-0680; MDA903-80-C-0107; MDA903-80-C-0432; DARPA Order 3773; DARPA Order 3423; DARPA Order 3709)
(AD-A127153) Avail: NTIS HC A02/MF A01 CSCL 09/5

This report summarizes progress on VLSI (Very Large Scale Integration) Systems Research Projects from November 1981 to April 1983, inclusive. The major areas under investigation have included: analysis and synthesis design aids, applications of VLSI, special purpose chip design, VLSI computer architectures, signal processing algorithms and architectures, reliability studies, hardware specification and verification, VLSI theory, and VLSI fabrication. The major research problems are introduced and progress is discussed; the Appendix contains a list of published research papers from these projects. Author (GRA)

N83-31962# TRW Space Technology Labs., Redondo Beach, Calif. Applied Technology Div.
APPLICATIONS OF JOSEPHSON JUNCTION SQUIDS SUPERCONDUCTING QUANTUM INTERFERENCE DEVICE) AND ARRAYS Annual Progress Report, 1 Sep. 1981 - 30 Sep. 1982
A. H. Silver Nov. 1982 42 p refs
(Contract N00014-81-C-0615)
(AD-A127135; APR-1) Avail: NTIS HC A03/MF A01 CSCL 09/5

This is the first Annual Report for an effort to demonstrate the application of SQUIDs (Superconducting Quantum Interference Device) and SQUID arrays to microwave systems. The application considered here is a microwave voltage-controlled oscillator. We report on the circuit design, numerical simulation, experimental design, and fabrication of the device including tests of the monolithic impedance transformer. Predicted available power is approximately 10 nW into a load impedance of ohm. GRA

N83-31963# California Univ., Davis. Signal and Image Processing Lab.
DESIGN AND IMPLEMENTATION OF MULTI-INPUT ADAPTIVE SIGNAL EXTRACTIONS Final Report, 1 Jun. 1980 - 31 Jul. 1982
William A. Gardner and Michael A. Soderstrand Sep. 1982 23 p refs
(Grant AF-AFOSR-0189-80; AF Proj. 2304)
(AD-A127038; SIPL-82-12; AFOSR-83-0262TR) Avail: NTIS HC A02/MF A01 CSCL 09/5

This report covers research on design and implementation of novel adaptive digital signal processors for signal extraction (i.e., reduction of noise, interference, and distortion). The signal extractor configurations and adaptive adjustment schemes considered are extensions and generalization of prior art (viz., the FIR digital filter and the LMS adjustment algorithm) that consist of various combinations and interconnections of conventional adaptive filtering and noise cancelling configurations and associated adaptive adjustment schemes. The methods of implementation considered are based on speed-cost efficient Residue Number System arithmetic, and include Read Only Memory table look-up, and microprocessors and minicomputers for hardware control and for software implementation. The major goals of the research are improvements over prior art in signal extraction performance (as measured by signal distortion, signal-to-noise ratio, and mean squared error) and in the cost of implementation and speed of operation. Results on design, implementation, and performance of configurations and adjustment schemes are described. GRA

N83-31964# Army Construction Engineering Research Lab., Champaign, Ill. Energy Systems Div.
ELECTRONIC TIME SWITCH EVALUATION STUDY Final Technical Report
Lee R. Thurber Mar. 1983 22 p
(DA Proj. 4A7-62781-AT-45)
(AD-A127870; CERL-TR-E-184) Avail: NTIS HC A02/MF A01 CSCL 09/1

This report describes a study which tested and evaluated the feasibility of using electronic time switches to reduce the electrical energy consumption of Army buildings which may not be suited to other energy-saving techniques like the Energy Monitoring and Control System. The study emphasized heating, ventilating, and air-conditioning (HVAC) system controls in office and community support buildings. Electronic time switches were installed in 12 buildings at Fort Carson, CO, and Fort Knox, KY. Test results showed savings of between 12 kWh and 99 kWh per day for the electrical energy consumed in the test buildings. Payback periods ranged from 5 months to 3-1/2 years. This report also includes

guidance on selecting and installing electronic time switches on HVAC system controls. Author (GRA)

N83-31965# E-Systems, Inc., St. Petersburg, Fla. ECI Div.
A 500-WATT SOLID-STATE RF POWER AMPLIFIER AM-7209( )/VRC Quarterly Report, 1 Sep. - 15 Dec. 1982
M. Harris 18 Mar. 1983 115 p refs
(Contract DAAB07-82-C-J231; DA Proj. 1X4-63707-04-37)
(AD-A127462; CECOM-82-C-J231; GO-61289; QR-1) Avail: NTIS HC A06/MF A01 CSCL 17/2

The development, fabrication, and test of three advanced development model 500-watt VHF power amplifiers to be used to increase the output of presently-deployed RT-524 (VRC-12) VHF radios and future equipment such as the SINCGARS-V equipment is documented in this report. The power amplifier, as defined in US Army Communications-Electronics Command contract DAAB07-82-C-J231, is a state-of-the-art stand-alone design utilizing a combination of the latest design techniques in RF elements, control circuits, packaging techniques, and amplifier architecture. GRA

N83-31966# Texas Univ., Austin. Dept. of Chemistry.
SEMICONDUCTOR ELECTRODES. PART 51: EFFICIENT ELECTROLUMINESCENCE AT ZnS ELECTRODE IN AQUEOUS ELECTROLYTES
Fu-Ren Fan, Patrick Leempoel, and Allen J. Bard 1 Apr. 1983 56 p refs Submitted for publication Sponsored in part by Solar Energy Research Inst.
(Contract N00014-78-C-0592; NR Proj. 051-693)
(AD-A127454; TR-30) Avail: NTIS HC A04/MF A01 CSCL 20/12

Electroluminescence (EL) on ZnS was studied in aqueous solutions containing various redox species. For species able to generate strongly oxidizing intermediates, such as peroxydisulfate or hydrogen peroxide, bright blue luminescence was observed during cathodic polarization at potentials near to or negative of flat-band potential (Vfb) of ZnS. For solutions containing supporting electrolyte alone at various pH's, no emission was detectable even at potentials 7 volts negative of Vfb. This suggests that minority-carrier (hole) injection is responsible for the initiation of EL. The peak energy of the EL spectrum was much smaller (by 1 eV) than the bandgap of ZnS, suggesting that the radiative recombination is through intermediate luminescent centers. Under steady state conditions, the EL intensity was proportional to the square of the current, suggesting that EL intensity is dominated by the recombination of electron-hole pairs at luminescent centers. In the early part of a potential pulse (especially the first pulse), the growth behavior of EL intensity was strongly affected by the electron trapping of the empty upper luminescent states. The location of the EL spectra depended on the current density and the EL intensity; with increasing EL intensity, a significant blue shift of the emission peak was observed. GRA

N83-31967# Aerospace Corp., El Segundo, Calif. Engineering Group.
STATE-OF-THE-ART ASSESSMENT OF TESTING AND TESTABILITY OF CUSTOM LSI/VLSI CIRCUITS. VOLUME 4: TEST GENERATION Final Report
M. A. Breuer and A. J. Carlan Oct. 1982 67 p refs 8 Vol.
(Contracts F04701-82-C-0083; F04701-80-C-0081; F04701-81-C-0082)
(AD-A127985; SD-TR-83-20-Vol-4; TR-0083(3902)-1-Vol-4) Avail: NTIS HC A04/MF A01 CSCL 09/5

Two major approaches are considered for generating tests for digital systems: methods based on detailed circuit models of the unit under test (UUT) and methods based primarily on a functional description of the UUT. In addition to test generation of general digital systems, the testing requirements of microprocessors, semiconductor memories and PLA are examined. The D-algorithm and several variants are discussed as a basis for practical test generation procedures. Author (GRA)

N83-31968# Aerospace Corp., El Segundo, Calif. Engineering Group.
STATE-OF-THE-ART ASSESSMENT OF TESTING AND TESTABILITY OF CUSTOM LSI/VLSI CIRCUITS. VOLUME 1: EXECUTIVE SUMMARY Final Report
M. A. Breuer and A. J. Carlan Oct. 1982 24 p 8 Vol.
(Contracts F04701-82-C-0083; F04701-80-C-0081; F04701-81-C-0082)
(AD-A127984; SD-TR-83-20-Vol-1; TR-0083(3902)-1-Vol-1) Avail: NTIS HC A02/MF A01 CSCL 09/5

This project is a two-phase study dealing with testing and testability of custom LSI/VLSI circuits. The tasks summarized and evaluated in this report consisted of compiling and documenting a survey and assessment of the state-of-the-art for each of seven topics. Each of these topics has resulted in a formal report and are listed below: Vol. 2: Hardware Design Verification; Vol. 3: Fault Mode Analysis; Vol. 4: Test Generation; Vol. 5: Design for Testability; Vol. 6: Redundancy, Testing Circuits, and Codes; Vol. 7: Built-in Testing (BIT) and Built-in Test Equipment (BITE); and Vol. 8: Fault Simulation. GRA

N83-31969# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COMPOSITE COAXIAL TELECOMMUNICATIONS CABLE
Tadeusz Lapinski 2 Mar. 1983 6 p Transl. into ENGLISH from Wiadomosci Elektrotechn. (Poland), no. 19(522). 1 Oct. 1979 p 528
(AD-A127810; FTD-ID(RS)T-1795-82) Avail: NTIS HC A02/MF A01 CSCL 09/1

The long-distance composite coaxial telecommunications cable is described. It is used as a replacement for the coaxial and symmetrical cable. Specifications and capabilities are given. B.W.

N83-31970# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ELECTRONIC TECHNOLOGY (SELECTED ARTICLES)
7 Mar. 1983 18 p ref Transl. into ENGLISH from Dianzijishu (China), no. 8, 1982 p 2-5
(AD-A127809; FTD-ID(RS)T-0082-83) Avail: NTIS HC A02/MF A01 CSCL 17/2

The application of optical fibers to television, telephone, and data transmission is discussed. Digital and analog communication is discussed. Short distance data communication is examined in detail. R.J.F.

N83-31971# Aerospace Corp., El Segundo, Calif. Engineering Group.
STATE-OF-THE-ART ASSESSMENT OF TESTING AND TESTABILITY OF CUSTOM LSI/VLSI CIRCUITS. VOLUME 8: FAULT SIMULATION Final Report
M. A. Breuer and A. J. Carlan Oct. 1982 27 p refs
(Contracts F04701-82-C-0083; F04702-80-C-0081; F04701-81-C-0082)
(AD-A128019; SD-TR-20-Vol-8; TR-0083(3902-04)-1-Vol-8) Avail: NTIS HC A03/MF A01 CSCL 14/2

Fault simulation is widely used by industry in such applications as scoring the fault coverage of test sequences and construction of fault dictionaries. For use in testing VLSI circuits a simulator is evaluated by its accuracy, i.e., modelling capability. To be accurate simulators must employ multi-valued logic in order to represent unknown signal values, impedance, signal transitions, etc., circuit delays such as transport rise/fall, inertial, and the fault modes it is capable of handling. Of the three basic fault simulators now in use (parallel, deductive and concurrent) concurrent fault simulation appears most promising. Author (GRA)

N83-31972# TRW Space Technology Labs., Redondo Beach, Calif. Space and Technology Group.
DSCS 2 LLTWTA HELIX CURRENT ANOMALY Final Report
P. H. Fowler 1 Mar. 1983 53 p ref
(Contract F04701-80-C-0022)
(AD-A128008; SD-TR-83-18; TRW-36060-AR-025) Avail: NTIS HC A04/MF A01 CSCL 09/1

The DSCS II satellite uses a low-power TWTA as a driver stage for the power output tube. The tube is operated in a highly backed-off mode for linearity, giving an output of the order 23 dBm (maximum output power is 28 dBm). The preceding stage is a limiter, and the system is set up with attenuator pads so that the maximum limiter output just saturates the output TWTA. Forty-four of the driver amplifiers have been operated in orbit, for intervals ranging from a few days (orbital testing redundant chain) to over nine years. Several of the driver tubes have caused problems of varying severity by losing gain, to the point the output tube could no longer be driven to saturation. To date no service has been cut short of its design life by this problem as there has always been a working backup to complete the mission. The immediate cause of the gain loss is a rise in helix current to as much as 20 percent of the beam, accompanied by a slow loss of about 20 percent of the cathode current. Several investigations have been made into the mechanism underlying this effect, leading to some tentative conclusions. GRA

N83-31973# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE NMR (NUCLEAR MAGNETIC RESONANCE) SENSOR FOR CALIBRATING THE FIELD OF A SUPERCONDUCTING SOLENOID

V. B. Pluzhnikov 4 Mar. 1983 7 p refs Transl. in ENGLISH from Sbornik Nauchnykh Trudov Piziko-Teknicheskiy Institut Nizkikh Temperatur (USSR), v. 18, 1972 p 15-16

(AD-A127997; FTD-ID(RS)T-0104-83) Avail: NTIS HC A02/MF A01 CSCL 09/1

A description is given of a simple construction of a magnetic field sensor, used to calibrate the field of a superconducting solenoid by the Nuclear Magnetic Resonance (NMR) method with the help of the IMI-2 (yell-z) gaussmeter. B.G.

N83-31974# Michigan Univ., Ann Arbor.

MEASURED CHARACTERISTICS OF MULTI-GAP LOOP AND ASYMPTOTIC CONICAL DIPOLE ELECTROMAGNETIC FIELD SENSORS Final Report

V. V. Liepa and T. B. A. Senior Kirtland AFB, N. Mex. AFWL Mar. 1983 160 p refs

(Contract F29601-78-C-0082; AF Proj. 3763)

(AD-A127817; AFWL-TR-82-82; EMPTD-6-UM-001; REPT-017816-1-F) Avail: NTIS HC A08/MF A01 CSCL 09/1

The frequency responses of the MGL-2D(A), MGL-6A(A) and ACD-4A(R) free-space sensors have been measured and analyzed. The measurements were made over the frequency range 118 to 4400 MHz whose upper limit far exceeds the 3-dB roll-off frequencies for the sensors. All three sensors were evaluated in terms of the linearity of the frequency response, the angular behavior vis-a-vis a dipole pattern, and the rotational symmetry (MGL sensors only). Whereas the linearity persists only slightly beyond the roll-off frequencies, the dipole and symmetry properties extend to frequencies two or three times greater. In addition, some preliminary data for the MGL-5B(R) and MGL-7A(R) ground plane sensors are presented. Author (GRA)

N83-31975# Aerospace Corp., El Segundo, Calif. Engineering Group.

STATE-OF-THE-ART ASSESSMENT OF TESTING AND TESTABILITY OF CUSTOM LSI/VLSI CIRCUITS. VOLUME 7: BUILT-IN TESTING (BIT) AND BUILT-IN TEST EQUIPMENT (BITE) Final Report

A. J. Carlan and M. A. Breuer Oct. 1982 42 p refs Prepared in cooperation with Breuer and Assoc., Encino, Calif.

(Contracts F04701-80-C-0081; F04701-81-C-0082; F04701-82-C-0083)

(AD-A128587; SD-TR-83-20-Vol-7; TR-0083(3902-04)-1-Vol-7) Avail: NTIS HC A03/MF A01 CSCL 14/2

Concurrent testing and nonconcurrent testing are the two major BIT techniques employed in VSLI circuit design: concurrent testing and nonconcurrent testing; concurrent testing allows circuit checkout during normal system; and may employ error detecting codes, self checking circuits; replication or electrical monitoring. Nonconcurrent testing requires a special test mode during which normal system operation is halted. Circuits must be added to generate the test patterns used during test mode. Nonconcurrent testing is initiated by hardware implemented BITE or diagnostic software. Author (GRA)

N83-31976# Sandia Labs., Albuquerque, N. Mex.

IBEX FOILLES DIODE EXPERIMENTS

R. B. Miller, M. G. Mazarakis, J. W. Poukey, and R. J. Adler (Mission Research Corp., Albuquerque, N. Mex.) 1983 6 p refs Presented at the Particle Accelerator Conf., Santa Fe, N. Mex., 21 Mar. 1983 Sponsored in part by AF

(Contract DE-AC04-76DP-00789)

(DE83-009185; SAND-83-0628C; CONF-830311-9) Avail: NTIS HC A02/MF A01

A new high voltage isolated Blumlein accelerator (IBEX) has been designed and constructed. A new accelerator pulse-forming-line (PFL) configuration produces an output voltage pulse equal to the PFL charge voltage for a matched load (as in a conventional Blumlein circuit); however, the prepulse level is a negligible and both sides of the diode remain at electrostatic ground potential. With a matched planar diode load, IBEX has generated a 4 MeV, 100 kA electron beam. In the present stage of experimentation, a foilless diode load is being used to produce 3 to 4 MeV, 20 to 30 kA annular electron beams with an applied magnetic field strength of approx. 10 kG. DOE

N83-31977# Sandia Labs., Albuquerque, N. Mex.

GaP/Al-x/Ga-1-x/P HETEROJUNCTION BIPOLAR JUNCTION TRANSISTOR FOR HIGH-TEMPERATURE ELECTRONIC APPLICATIONS

T. E. Zipperian and L. R. Dawson 1982 12 p refs Presented at the IEEE Intern. Electron Devices Meeting, San Francisco, 13 Dec. 1982

(Contract DE-AC04-76DP-00789)

(DE83-001267; SAND-82-1544C; CONF-821207-1) Avail: NTIS HC A02/MF A01

Useful bipolar transistor action over the full temperature range from 78 to 823K was demonstrated for mesa-isolated, liquid phase epitaxial n(+)npn, GaP/Al(0.35Ga(0.65)P/GaP/GaP) structures. This represents both the highest temperature and the widest temperature range (745K) over which useful solid state transistor action was demonstrated in any 3-5 compound semiconductor system. These results imply that the GaP/Al/sub x/Ga/ sub 1-x/P chemical system is an excellent materials candidate in which to base a technology for high temperature electronics and the results also imply the very real possibility of functional solid-state devices and circuits at temperatures in excess of 500 C. DOE

N83-31978# Brookhaven National Lab., Upton, N. Y.

STUDY OF THE ELECTRIC FIELD INSIDE MICROCHANNEL PLATE MULTIPLIERS

E. Gatti, K.L Oba, and P. Rehak 1982 9 p refs Presented at the Nucl. Sci. Symp., Washington, D.C., 20-22 Oct. 1982

(Contract DE-AC02-76CH-00016)

(DE83-003944; BNL-32262; CONF-821011-22) Avail: NTIS HC A02/MF A01

Electric field inside high gain microchannel plate multipliers was studied. The calculations were based directly on the solution of the Maxwell equations applied to the microchannel plate (MCP) rather than on the conventional lumped RC model. The results are important to explain the performance of MCP's under a pulsed bias tension and, at high rate conditions. The results were tested experimentally and a new method of MCP operation free from the positive ion feedback was demonstrated. DOE

N83-31979# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

THE CRT DISPLAY EVALUATION: THE MULTIDIMENSIONAL RATING OF CRT-GENERATED DISPLAYS

D. L. Getman, H. S. Blackman, W. W. Banks, and R. J. Petersen Oct. 1982 38 p refs

(Contract DE83-003699)

(DE83-003699; NUREG/CR-2942; EGG-2220) Avail: NTIS HC A03/MF A01

This report is one in a series evaluating various methods for determining the effectiveness of display formats and contains results from multidimensional rating of three cathode ray tube displays. Each display contained information regarding the status of nine safety parameters critical to safe operations the Loss-Of-Fluid Test (LOFT) reactor located at the Idaho National Engineering Laboratory (INEL). Certified LOFT operators evaluated three formats - bars, stars, and meters - as part of a multimethod display evaluation ongoing at INEL. Each of the six cognitive dimensions embedded in the rating scale are discussed in terms of their internal consistency and ability to differentiate between each of the three formats. Preliminary findings suggest that two of the six dimensions, content integration and cognitive processing, were able to discriminate between formats while satisfying the criteria of internal consistency as measured by Cronbach's alpha. Conclusions in this report must be interpreted in light of moderate test-retest reliability. DOE

N83-31980# Sandia Labs., Albuquerque, N. Mex.
EQUIPMENT QUALIFICATION RESEARCH TEST OF ELECTRICAL CABLE WITH FACTOR SPLICES AND INSULATION REWORK: TEST NO. 2, REPORT NO. 1
E. E. Minor and D. T. Furgal Sep. 1982 76 p refs
(Contract DE-AC04-76DP-00789)
(DE83-002165; NUREG/CR-2932/1; SAND-81-2027/1) Avail: NTIS HC A05/MF A01

Electric cables with flame retardant chemically crosslinked polyolefin extruded insulation containing factory made center conductor splices and insulation repairs manufactured by the Rockbestos Company were used in a methodology test of the IEEE Standard 383-1974. Cable specimens were radiation aged at a low dose rate and then thermally aged to simulate a 40 year containment exposure. After aging, the specimens were subjected to LOCA radiation and a 33 day steam and chemical spray exposure. The cables were electrically loaded and functioned without failure during and after LOCA steam and chemical spray exposure. Insulation resistance measurements were taken during the exposure sequence. Subsequence to the exposures, hipot and mandrel bend tests were conducted. To determine the most severe cable aging sequence, cable insulation material samples were subjected to varied aging exposure to observe sequence related and dose rate related material degradation. A dose rate effect was observed. DOE

N83-31981# California Univ., Berkeley. Lawrence Berkeley Lab.
A SIMPLE MULTIFUNCTION DISCRIMINATOR FOR MULTICHANNEL TRIGGERS
Michael R. Maier Oct. 1982 5 p refs Presented at the IEEE Meeting on Nucl. Sci., Washington, D.C., 20-22 Oct. 1982
(Contract DE-AC03-76SF-00098)
(DE83-004193; LBL-14456; CONF-821011-32) Avail: NTIS HC A02/MF A01

A simple version of a multifunction timing discriminator using only two integrated circuits is presented. It can be configured as a leading edge, a constant fraction, a zero cross or a dual threshold timing discriminator. Since so few parts are used, it is well suited for building multichannel timing discriminators. Two versions of this circuit are described: a quadruple multifunction discriminator and an octal constant fraction trigger. The different compromises made in these units are discussed. Results for walk and jitter obtained with these are presented and possible improvements are discussed. DOE

N83-31982# Stanford Linear Accelerator Center, Calif. Dept. of Physics.
VERSATILE SECONDARY TRIGGER FOR A MULTI-DETECTOR SYSTEM
Dale Ouimette, Dan Porat, Anthony Tilghman, and Charles Yong Oct. 1982 3 p ref Presented at the IEEE Nucl. Sci. Symp., Washington, D.C., 20 Oct. 1982
(Contract DE-AC03-76SF-00515)
(DE83-04414; SU-SLAC-PUB-2987; CONF-821011-34) Avail: NTIS HC A02/MF A01

The electronics of a secondary trigger for particle physics is described. The system was several desirable features that solve track recognition problems in situations where several subsystems of various cell configurations participate in the decision making. Track curvature and multiplicity are the criteria used. Versatility is attained through the use of programmable Array Logic (PAL) and a 48-bit wide ROM-based sequencer that determines, with the resolution of a cell, the participation of each element in the decision process. Data from layers with arbitrary numbers of cells are shifted in a programmable manner through a PROM mask containing eight different track definitions. The results of any one of the eight triggering criteria are available 5.6 microns after the end of drift interval. DOE

N83-31983# Power Technologies, Inc., Schenectady, N. Y.
DEVELOPMENT OF A LEAK LOCATION SYSTEM FOR USE ON UNDERGROUND ELECTRIC POWER TRANSMISSION CABLE Final Report
J. A. Williams Oct. 1982 208 p refs
(EPRI Proj. 7869-1)
(DE83-900533; EPRI-EL-2679) Avail: NTIS HC A10/MF A01

This report describes a study to evaluate methods for locating leaks of dielectric fluid from buried high voltage cable systems. Two primary types of leak location systems were investigated: (1) systems that will rapidly isolate the leak within a manhole section, typically 1000 m long on a feeder that might be 30 km long; and (2) systems that will then pinpoint the location of the leak. Rapid leak isolation was accomplished by developing an enhanced conductivity oil probe which allows the injection of a small quantity of conductive oil and which indicates the path of the oil as it drifts downstream in the direction of the leak. Two methods for pinpointing the leak were proven. The more successful method was the use of trained leak location dogs which were found to have far better sensitivity than instruments and which could detect cable oil alone without the need for additives. A tracer gas injection and detection scheme was developed for use in areas where the dogs may be unsuitable. DOE

N83-31984# Cherrywood Farms, Williamsburg, Mich.
PROJECT DEMONSTRATION OF WIND TURBINE ELECTRICITY: INTERCONNECTING A NORTHERN MICHIGAN FRUIT FARM WITH A MAJOR UTILITY Final Report
David M. Amon 1982 259 p
(Grant DE-FG02-80R5-10226)
(DE83-001387; DOE/R5-10226/2) Avail: NTIS HC A12/MF A01

A project to interconnect a farm wind turbine with a utility is reported. Included are a summary of accomplishments and daily major events, correspondence relevant to the project (letters explaining the delay of installation, extending the period of performance, tax credits, net energy sellback legislation, etc.), publicity, legal aspects, maintenance and repair, analysis of test data, and accounting. DOE

N83-31985# Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Electronics.
RESIDUAL-STRESS CHARACTERIZATION BY USE OF ELASTIC-WAVE-SCATTERING MEASUREMENTS
E. Domany and J. E. Gubernatis (Los Alamos Science Lab., N. Mex.) 1982 19 p refs Presented at the Rev. of Progr. in Quant. NDE, San Diego, Calif., 1-6 Aug. 1982
(Contracts W-7405-eng-36; W-7405-eng-82)
(DE83-000647; LA-UR-82-2664; CONF-820820-5) Avail: NTIS HC A02/MF A01

The presence of a state of residual stress in a material can impair its structural quality by adversely affecting its elastic limit, yield point, etc. The appropriate equations for the use of elastic waves to probe an inhomogeneous state of residual are derived. Unlike other treatments, which relate these nonlinear effects to small relative changes in propagation speed of an incident wave, these effects are identified as a source of scattering of the incident wave. Like other treatments, one difficulty with ultrasonic residual

stress measurements is separating small residual stress effects for other effects. Elastic wave propagation in the presence of non-uniform residual stress is viewed as a scattering problem. One should note that in various limits, such as that of short wavelength, this scattering problem (as well as any other) is treated by optical methods (ray bendings, diffraction, etc.). DOE

N83-31986# Los Alamos Scientific Lab., N. Mex.
FAULT-CURRENT LIMITER USING A SUPERCONDUCTING COIL
H. J. Boenig and D. A. Paice (Westinghouse Electric Corp., Pittsburgh) 1982 4 p refs Presented at the Appl. Superconductivity Conf., Knoxville, Tenn., 30 Nov. - 1 Dec. 1982
(Contract W-7405-eng-36)
(DE83-003557; LA-UR-82-3437; CONF-821108-8) Avail: NTIS HC A02/MF A01

A novel circuit, consisting of solid state diodes and a biased superconducting coil, for limiting the fault currents in three phase ac systems is presented. A modification of the basic circuit results in a solid state ac breaker with current limiting features. The operating characteristics of the fault current limiter and the ac breaker are analyzed. An optimization procedure for sizing the superconducting coil is derived. DOE

N83-31987# Brookhaven National Lab., Upton, N. Y.
GENERAL-PURPOSE STEPPING MOTOR-ENCODER POSITIONING SUBSYSTEM WITH STANDARD ASYCHRONOUS SERIAL-LINE INTERFACE
F. W. Stubblefield and J. L. Alberi (Bell Labs., Lincroft, N.J.) 1982 9 p refs Presented at the IEEE Nucl. Sci. Symp., Washington, D.C., 19-22 Oct. 1982
(Contract DE-AC02-76CH-00016)
(DE83-004634; BNL-32173; CONF-821011-26) Avail: NTIS HC A02/MF A01

A general purpose mechanical positioning subsystem for open loop control of experiment devices which have their positions established and read out by stepping motor encoder combinations was developed. The subsystem is used mainly for experiments conducted at the National Synchrotron Light Source. The subsystem unit was designed to be compatible with a wide variety of stepping motor and encoder types. The unit is operated by any device capable of driving a standard RS-232-C asynchronous serial communication line. An informal survey has shown that several experiments at the Light Source will use one particular type of computer, operating system, and programming language. Accordingly, a library of subroutines compatible with this combination of computer system elements was written to facilitate driving the positioning subsystem unit. DOE

N83-31988# Oak Ridge Y-12 Plant, Tenn.
IMPROVING DIVIDER CALIBRATION TECHNIQUES
Ross Endsley 1983 14 p refs Presented at the Measurement Sci. Conf., Palo Alto, Calif., 20-21 Jan. 1983
(Contract W-7405-eng-26)
(DE83-004061; Y/IA-156; CONF-830113-1) Avail: NTIS HC A02/MF A01

This paper describes the development of a procedure for calibration of precision voltage dividers. The procedure makes use of a reference divider made up of NBS type resistors and a calibrated null detector. Although developed primarily for a seven dial Kelvin-Varley divider with a span of 2111.111 units, it is adaptable to dividers with other spans. Typical results are presented along with a statistical discussion of repeatability. Advantages of the procedure are improved repeatability, increased confidence in corrections, more rapid data acquisition, and independence from NBS for divider calibration. DOE

N83-31989# Cable Technology Labs., Inc., New Brunswick, N.J.
ELECTRICAL-BREAKDOWN CHARACTERISTICS AND TESTING OF HIGH-VOLTAGE XLPE- AND EPR-INSULATED CABLES
G. Bahder, M. Sosnowski, C. Katz, R. Eaton (DOE, Washington, D.C.), and K. Klein (DOE, Washington, D.C.) 1982 10 p refs Presented at the IEEE Power Eng. Soc. Winter Meeting, New York, N.Y., 31 Jan. 1983
(Contract DE-AC02-80RA-50156)
(DE83-000721; DOE/RA-50156-4; CONF-830107-1) Avail: NTIS HC A02/MF A01

Threshold voltages and other basic breakdown characteristics, spanning times from microseconds to cable life expectancy, were determined for cross-linked polyethylene (XLPE) and ethylene propylene rubber (EPR) cables. These results are based upon measurements of 60Hz, high frequency, impulse, and impulse with dc bias voltages. Based on the breakdown characteristics an improved, procedure for the factory testing of full-reels of polymeric insulated cables and for 2 year qualification testing of XLPE cables is proposed. This procedure can help assure proper performance of cables throughout their service life. DOE

N83-31990# Strategic Decisions Group, Menlo Park, Calif.
GENERATING CAPACITY IN US ELECTRIC UTILITIES: HOW IS IT USED? HOW MUCH IS NEEDED OVER THE DECADE
Thomas W. Keelin, Eugene N. Oatman (EPRI), and Michehl R. Gent Oct. 1982 39 p refs Sponsored by EPRI
(DE83-900733; EPRI-EA-2639-SR) Avail: NTIS HC A03/MF A01

This report addresses: how US generating capacity is used to supply today's consumers with electricity; whether new capacity planned over the next decade is enough to provide a secure supply of electricity; how delays and cancellations of planned capacity would result in higher electricity costs and threaten the security of electricity supply; and how today's decisions determine electricity supply for the next decade and beyond. It is concluded that there is not an electricity supply crisis currently, but there is a planning crisis. This conclusion is based on the following: existing capacity supplies current needs, but provides little room for economic growth; new capacity is planned to provide a secure supply of electricity for the demand projected by utilities; if demand is lower, planned capacity will reduce costs and, if demand is higher, planned capacity will not be adequate; planned capacity may not be realized. Author

N83-31991# Sheffield Univ. (England). Dept. of Control Engineering.
PLANT STEP DATA AND GAIN ESTIMATES IN THE ROBUST FEEDBACK TUNING REGULATOR PROBLEM
D. H. Owens, A. Chotai, and H. M. Wang Jan. 1983 19 p refs
(Grant SRC-GR/B/23250)
(RR-211) Avail: NTIS HC A02/MF A01

Estimates of the maximum gain required to retain stability of Davison's robust feedback regulator are derived based on graphical operations on plant open loop step response data. It is assumed that the exact plant model is not known, but that open loop transient step data are available. Lower bounds for the maximum gain are derived based upon the total variation of the error in modeling availabie plant step responses by a simple first order model. Nyquist-type criteria based on the variation of the integrated modeled error are provided by two theorems. Results indicate that the method can work well in practice, although it can be conservative in its predictions. Author (ESA)

N83-31992# Electricity Council Research Centre, Capenhurst (England).
LOW COST HARMONIC ANALYSER FOR THE DISTRIBUTION NETWORK
S. J. Kearley May 1982 10 p refs Presented at the I.E.E. Conf., 5 May 1982
(PB83-184697; ECRC/M-1575) Avail: NTIS HC A02/MF A01 CSCL 09C

An automatic harmonic analyzer was developed to measure voltage and current distortion magnitudes in the electric power distribution network. The analyzer conforms to British Engineering Recommendation G5/3 and uses a signal recovery technique and a single chip microcomputer. This results in a cheaper, lighter and smaller instrument compared with conventional harmonic analyzers. A hybrid design was selected after consideration of analogue and digital solutions. A linear multiplier was incorporated

resulting in economic gains over traditional approaches. Automatic features, including a self-test function, were included to simplify operation and enable use by non-specialist personnel. The availability of the new equipment was predicted to reduce the costs and time incurred by engineers monitoring harmonics on distribution systems. GRA

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N83-31993* National Aeronautics and Space Administration. Pasadena Office, Calif.
SYSTEM FOR MONITORING PHYSICAL CHARACTERISTICS OF FLUIDS Patent
Eugene H. Trinh (JPL, California Inst. of Tech., Pasadena) and Taylor G. Wang, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 5 Jul. 1983 7 p Filed 23 Mar. 1981 Supersedes N81-34384 (19 - 15, p 2055) Sponsored by NASA
(NASA-Case-NPO-15400-1; US-Patent-4,391,129; US-Patent-Appl-SN-246774; US-Patent-Class-73-64.4; US-Patent-Class-250-573) Avail: US Patent and Trademark Office CSCL 20D

An apparatus and method are described for measuring physical characteristics of fluid, by placing a drop of the fluid in a batch of a second fluid and passing acoustic waves through the bath. The applied frequency of the acoustic waves is varied, to determine the precise value of a frequency at which the drop undergoes resonant oscillations. The resonant frequency indicates the interfacial tension of the drop in the bath, and the interfacial tension can indicate physical properties of the fluid in the drop.
Official Gazette of the U.S. Patent and Trademark Office

N83-31994 British Aerospace Aircraft Group, Kingston-upon-Thames (England).
THE TRAJECTORY OF A HEATED, BUOYANT JET IN A NON-UNIFORM CROSS-FLOW
J. R. Smy 16 Aug. 1982 33 p refs
(BAe-KAD-GEN-N-2868) Copyright. Avail: Issuing Activity

A method is described to determine the path taken by a jet injected at an angle into a cross flow. The empirical correlation between the variables in the flow is used to predict the jet path, the center line velocity and temperature at injection angles up to a moderate forward inclination. Allowance is made for temperature and density differences and for nonuniformities in the cross flow. The equations are solved by a fourth-order Runge-Kutta routine in a VAX-11 computer. The examples show that the method produces reliable results within its expected regime even with the jet directed 30 deg forward. Buoyancy effects need to be calibrated.
Author (ESA)

N83-31995# British Library Lending Div., Boston Spa (England).
CALCULATION OF TURBULENT CONVECTIVE HEAT EXCHANGE IN A CYLINDRICAL CHANNEL WITH A SUDDEN EXPANSION: COMMUNICATION 2
L. N. Toritsyn, E. R. Cheshchevik, and V. L. Sovetkin 1983 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 6, 1982 p 117-120
(BLL-M-34991-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

A mathematical model has been developed for calculating convective heat exchange in a channel in which there is a sudden increase in cross section. The results of calculations of Nusselt-number distribution along such a channel for different wall temperature conditions are presented. The calculated results are analyzed and compared with experimental data. Author

N83-31996*# Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
MANUFACTURING IN SPACE: FLUID DYNAMICS NUMERICAL ANALYSIS Monthly Progress Report, 8 Jul. - 7 Aug. 1983
S. J. Robertson 17 Aug. 1983 5 p
(Contract NASw-3281)
(NASA-CR-172944; NAS 1.26:172944; LMSC-HREC-PR-D867267) Avail: NTIS HC A02/MF A01 CSCL 20D

Lockheed-developed fluid dynamics numerical analysis computer codes were utilized to numerically simulate the development of convective motion in experiment configurations of interest to NASA. Author

N83-31997# Purdue Univ., Lafayette, Ind. Thermal Sciences and Propulsion Center.
ANALYSIS OF STEADY, 2-DIMENSIONAL CHEMICALLY REACTING NONEQUILIBRIUM FLOW BY AN UNSTEADY, ASYMPTOTICALLY CONSISTENT TECHNIQUE. VOLUME 1: THEORETICAL DEVELOPMENT Final Report, Sep. 1979 - Sep. 1981
Randall J. Stiles and Joe D. Hoffman Sep. 1982 78 p refs
(Contract F33615-79-C-2065; AF Proj. 3012)
(AD-A127219; AFWAL-TR-81-2127-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 20/4

A method has been developed for solving the equations governing two-dimensional, unsteady, chemically reacting nonequilibrium flow. Subsonic, transonic, and supersonic flow fields can be analyzed using this technique. The steady state solution is obtained as the asymptotic solution to the unsteady equations, with steady flow boundary conditions applied, for large time. Interior mesh points are computed using MacCormack's method. Boundary points are calculated by a reference-plane characteristic scheme. The overall algorithm is inconsistent in time in the treatment of the species continuity equations, but is consistent at the steady state limit. The species continuity equations are integrated by a second-order accurate implicit method. Nonuniform, nonequilibrium conditions may be specified at the nozzle inlet. The chemical kinetics model considers 19 species formed from the elements carbon, hydrogen, oxygen. nitrogen, fluorine, and chlorine, and 48 chemical reactions. Unburned hydrocarbons and a subglobal oxidation reaction for these species is also included in the model. A production-type computer program was developed and used to analyze several problems. Author (GRA)

N83-31998# United Research Corp., Santa Monica, Calif.
ROTATIONAL AND IRROTATIONAL FREESTREAM DISTURBANCES INTERACTING INVISCIDLY WITH A SEMI-INFINITE PLATE Final Report, Mar. 1979 - Aug. 1982
Harold L. Rogler and Eli Reshotko Arnold AFS, Tenn. AEDC Apr. 1983 48 p refs
(Contract F40600-79-C-0002; Grant AF-AFOSR-2577A-74)
(AD-A127009; AEDC-TR-83-3; URC-TR-82-05) Avail: NTIS HC A03/MF A01 CSCL 20/4

This report is part of a search for all possible classes of linear disturbances that can arise in a flowfield and thus serve as descriptive elements for a general disturbance flowfield. This report examines the velocity and pressure fields of disturbances that exist in a full two-dimensional unsteady incompressible inviscid flowfield about a semi-infinite flat plate. The permissible classes of disturbances include rotational as well as irrotational disturbances. Because of the linearity of the treatment, superpositions of these are also included. In general, the disturbances do not vanish far from the plate and in some instances are unbounded at infinite distances from the plate. These unbounded disturbances are retained, since they are relevant to applications involving finite domains, for example, in wind tunnels. In this elliptic problem, the semi-infinite plate exerts an irrotational upstream influence which is composed of a pattern of standing waves. Downstream of the leading edge, the flowfield is also altered by an irrotational flow, but this irrotational flow is composed of both standing and traveling waves. Author (GRA)

N83-31999# Rutgers - The State Univ., New Brunswick, N. J. Dept. of Mechanical, Industrial and Aerospace Engineering.
THEORETICAL INVESTIGATION OF THREE-DIMENSIONAL SHOCK WAVE-TURBULENT BOUNDARY LAYER INTERACTIONS Annual Interim Report, 1 Oct. 1981 - 10 Sep. 1982
Doyle D. Knight Dec. 1982 50 p refs
(Grant AF-AFOSR-0230-83)
(AD-A127118; RU-TR-157-MAE-F; AFOSR-83-0230TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

The overall focus of the research effort is the understanding of the physical structure of 3-D shock wave-turbulent boundary layer interactions. The approach utilizes the full mean compressible Navier-Stokes equations with turbulence incorporated through the algebraic turbulent eddy viscosity model of Baldwin and Lomax. The research effort is categorized into two major areas. First, the efficacy of the Baldwin-Lomax model is examined for the 2-D supersonic compression ramp at Mach 3 and a Reynolds number based on upstream boundary layer thickness of 1.6 million. The results indicate that the Baldwin-Lomax model underestimates the upstream propagation of the shock-boundary layer interaction, and underestimates the recovery of the boundary layer downstream of reattachment. The incorporation of a simple relaxation modification to the eddy viscosity greatly improves the prediction of the upstream propagation, but does not appreciably affect the prediction of the downstream recovery of the boundary layer. Second, the three-dimensional interaction of an oblique shock wave with a turbulent boundary layer (the 3-D 'sharp fin' configuration) at Mach 3 has been computed for two different shock strengths (i.e., shock-generator angles), and the results compared with the extensive experimental data. Present results indicate that the Baldwin-Lomax model provides an accurate prediction of a wide variety of flow properties, including surface pressure, heat transfer, yaw and pitch angle, static pressure and pitot pressure. GRA

N83-32000# Wisconsin Univ., Madison. Center for Mathematics Research.
A VARIATIONAL APPROACH TO SURFACE SOLITARY WAVES
R. E. L. Turner Jan. 1983 52 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-04426)
(AD-A127707; MRC-TSR-2473) Avail: NTIS HC A04/MF A01 CSCL 12/1

The research in experimental and theoretical hydrodynamics in the last few decades has indicated that solitary waves play a special role in the evolution of general disturbances in fluids. Still, the investigation of solitary waves and, in particular, the use of variational principles associated with these waves is far from complete. While variational principles for surface waves in fluids of constant density have been discussed in the literature, the existence proofs given here appear to be the first rigorous use of critical point theory to obtain surface waves. Moreover, we treat a class of density profiles not heretofore included in an exact theory. In this report we treat a two-dimensional flow for an incompressible, inviscid fluid in a region with a horizontal bottom of infinite extent and a free upper surface. The fluid is acted on by gravity and has a non-diffusive, variable density which may be discontinuous. It is shown by means of a variational principle that the governing equations allow both periodic and single-crested progressing waves of permanent form, the analogues, respectively, of the classical cnoidal and solitary waves. The solitary waves are obtained from periodic ones as the periods grow unboundedly. All of the waves obtained have elevated streamlines and have speeds greater than the critical speed associated with the ambient density. Further, the amplitudes are shown to be exponentially decreasing away from the crest. GRA

N83-32001# Colorado Univ., Boulder. Dept. of Mechanical Engineering.
FLOW OF GAS-PARTICLE MIXTURES Annual Report, Sep. 1981 - Sep. 1982
Melvyn C. Branch Nov. 1982 14 p refs
(Grant AF-AFOSR-0065-82; AF Proj. 2308)
(AD-A127466; AFOSR-83-0272TR) Avail: NTIS HC A02/MF A01 CSCL 20/4

Two-phase supersonic flows dominate the structure of exhaust plumes of rocket engines with metallized propellants. Recent study has focused on the prediction of the characteristics of these exhaust plumes in order to evaluate plume visibility, radiation signatures and impingement effects. The objective of this study is to provide new experimental data on particle concentration, size distribution, transport effects, and particle interactions with shock waves in two phase jets. Progress in these measurements is decided in this annual scientific report. Author (GRA)

N83-32002# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Mathematics.
DISCRETIZATION AND SOLUTION TECHNIQUES FOR NAVIER-STOKES AND TRANSONIC FLOW PROBLEMS Final Report, 1 Jan. 1980 - 30 Apr. 1983
R. A. Nicolaides May 1982 13 p refs
(Grant AF-AFOSR-0091-80; AF Proj. 2304)
(AD-A127944; AFOSR-83-0344TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The major thrust of the research undertaken was to find the most efficient methods for solving viscous flow problems governed by the Navier-Stokes equations. Both external flows past obstacles and internal flows in tanks and channels were investigated. Two aspects in particular have been studied most thoroughly. These are the finite-element discretization of the flow equations and the implementation aspects involving most effective use of hardware in order to obtain small solution times. GRA

N83-32003# Purdue Univ., Lafayette, Ind. School of Mechanical Engineering.
WALL LAYER STRUCTURE AND DRAG REDUCTION: BURSTING RATES Technical Progress Report, 2 Jan. - 31 Dec. 1982
William G. Tiederman and Thomas S. Luchik Dec. 1982 50 p refs
(Contract N00014-81-C-0210; SR0230101)
(AD-A128004; PME-FM-82-2) Avail: NTIS HC A03/MF A01 CSCL 20/4

The basic objective of this experimental study was to determine how the presence of a drag-reducing polymer solution in various portions of the wall region effects the bursting rate of the coherent wall layer structure and the wall shear stress. This was accomplished by injecting drag-reducing polymer solutions, glycerin solutions (whose viscosity matched those of the polymer solutions) and water into the viscous sublayer of fully developed, two-dimensional channel flows of water. Two injection flow rates and two set of slots were used. With thin slots and injection flow rates of 1/10 the sublayer flow rate, results were obtained when the injected solutions were confined almost entirely within the sublayer. With large slots and injection flow rates equal to the sublayer flow rate, results were obtained for situations where the injected fluid had mixed into the buffer region of the channel flow. Bursting rates were deduced from flow visualization dyed fluid while wall pressure measurements were used to determine the wall shear stress. GRA

N83-32004# Nielsen Engineering and Research, Inc., Mountain View, Calif.
TESTS OF SUBGRID-SCALE MODELS IN STRAINED TURBULENCE. STUDIES OF THE STRUCTURE OF HOMOGENEOUS SHEAR FLOWS: DEVELOPING A MODEL OF TURBULENCE NEAR A WALL FROM SOLUTIONS OF THE NAVIER-STOKES EQUATION Final Report, 1 Nov. 1976 - 31 Jul. 1982
J. H. Ferziger, O. J. McMillan, D. R. Chapman, and G. D. Kuhn Sep. 1982 52 p refs
(Contract N00014-77-C-0008; NR Proj. 061-244)
(AD-A128282; NEAR-TR-283; FR-4) Avail: NTIS HC A04/MF A01 CSCL 12/1

Three studies are described, each of which makes use of turbulent flow fields calculated using the Navier-Stokes equations. In the first study, exact numerical solutions of the full Navier-Stokes

equations are used to evaluate subgrid-scale models used in large-eddy simulations. The flows investigated are homogeneous and incompressible with strong imposed mean strain or shear. Models evaluated include the conventional Smagorinsky model as well as a recently introduced formulation based on the notion of scale similarity. In the second study, exact numberical simulations of homogeneous shear flows are examined using various computer-graphic tools, the aim being to attempt to understand the mechanisms underlying the production of turbulence energy and growth of length scales in such flows. The subject of the third study is the development of a computational model of the viscous sublayer of wall-bounded incompressible turbulent flow. In this work, the time-dependent Navier-Stokes equations, suitably simplified, are solved subject to boundary conditions imposed at the outer edge of the viscous sublayer. The formulation of these edge conditions so that computed average distributions of turbulence quantities agree with experimental data through the sublayer is the essence of work. GRA

N83-32005# Science Applications, Inc., McLean, Va.
ENERGY RELEASE AND FLUID DYNAMICS IN MULTIPHASE SYSTEMS Final Report
Kazhikathra Kailasanath and Ellis Hyman Mar. 1983 68 p refs
(Contract N00014-82-C-2037; SAI Proj. 1-157-18-519-00)
(AD-A128289; SAI-84-122-WA) Avail: NTIS HC A04/MF A01 CSCL 20/4

In the following discussion we will summarize the work performed by Science Applications, Inc. (SAI) on 'Energy Release and Fluid Dynamics in Multiphase Systems' (Contract N00014-82-C-2037, SAI Project 1-157-18-519-00) during the technical performance period ending 7 January 1983. During this contract period, our attention was focussed primarily on (1) deriving power-energy relations for the direct initiation of detonations, and (2) ignition behind incident shocks and the transition to detonation.
Author (GRA)

N83-32006# Northwestern Univ., Evanston, Ill. Dept. of Mechanical and Nuclear Engineering.
STATISTICAL MECHANICS OF NON-EQUILIBRIUM PROCESSES IN PLASMAS AND GASES Final Report
M. B. Lewis May 1983 20 p refs
(Contracts N00014-76-C-0089; N00014-75-C-0473)
(AD-A128339) Avail: NTIS HC A02/MF A01 CSCL 12/1

The turbulent equations for a neutral fluid are derived from the standpoint of Statistical Mechanics. The Three-Point Method of turbulence was investigated for limitations on the theory. Turbulent equations applicable to the adiabatic response of a plasma are developed. GRA

N83-32007# Wisconsin Univ., Madison. Center for Mathematics Research.
EXPLICIT SMOOTH VELOCITY KERNELS FOR VORTEX METHODS
J. T. Beale (Tulane Univ.) and A. J. Majda (California Univ.) Feb. 1983 16 p refs
(Contract DAAG29-80-C-0041; Grants NSF MCS-81-01639; NSF MCS-81-02360)
(AD-A127781; MRC-TSR-2480) Avail: NTIS HC A02/MF A01 CSCL 20/4

Recently the authors showed the convergence of a class of vortex methods for incompressible, inviscid flow in two or three space dimensions. These methods are based on the fact that the velocity can be determined from the vorticity by a singular integral. The accuracy of the method depends on replacing the integral kernel with a smooth approximation. The purpose of this note is to construct smooth kernels of arbitrary order of accuracy which are given by simple, explicity formulas. GRA

N83-32008# Tennessee Univ., Knoxville. Dept. of Mathematics.
MIXED FINITE ELEMENT METHODS WITH APPLICATIONS TO FLOW AND OTHER PROBLEMS Interim Report, 1 Apr. 1981 - 31 Mar. 1982
Max D. Gunzburger Feb. 1983 12 p refs
(Grant AF-AFOSR-0083-83; AF Proj. 2304)
(AD-A127751; AFOSR-83-0341TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Three problems were considered. These were finite element approximations due to the inhomogeneous Navier-Stokes equations, for potential flows, and for acoustic eigenvalue problems. In all cases both theoretical error estimates and computer codes implementing the best algorithm were developed. We also report on other activities sponsored by the grant, i.e., student research and conference talks. GRA

N83-32009# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
AN EFFECT OF TURBULENT DIFFUSION ON THE GLOW DISCHARGE-TO-ARC TRANSITION M.S. Thesis
Richard J. Wallace Mar. 1983 75 p refs
(AD-A128553) Avail: NTIS HC A04/MF A01 CSCL 20/4

In this thesis, an effect of turbulent gas flow on the glow discharge-to-arc transition is investigated. This is accomplished by solving the continuity equation for charged particles by two different numerical processes. They are a linearized solution and a non-linear numerical solution. The numerical results using an axi-symmetric cylindrical geometry show the charge particle density profile with respect to radial distance, time and diffusion coefficient. The effective increase in the diffusion coefficient between laminar and turbulent gas flow causes the charge density profile to expand more radially outward. This reduces the charge density within the original streamer volume tube causing a reduction in the conductivity of the streamer. This reduction in conductivity may possibly lead to a delay in the development of a breakdown streamer. As a result, the gas may be raised to higher current levels before breakdown occurs. GRA

N83-32010# Purdue Univ., Lafayette, Ind. School of Mechanical Engineering.
HEAT TRANSFER TO WATER FROM A VERTICAL TUBE BUNDLE UNDER NATURAL-CIRCULATION CONDITIONS
M. J. Gruszczynski and R. Viskanta Jan. 1983 57 p refs
(Contract W-31-109-eng-38)
(DE83-008459; NUREG/CR-3167; ANL-83-7) Avail: NTIS HC A04/MF A01; Also Avail: HC SOD

The natural circulation heat transfer data for longitudinal flow of water outside a vertical rod bundle are needed for developing correlations which are used in best estimate computer codes to model thermal hydraulic behavior of nuclear reactor cores under accident or shutdown conditions. The heat transfer coefficient between the fuel rod surface and the coolant is the key parameter required to predict the fuel temperature. Because of the absence of the required heat transfer coefficient data base under natural circulation conditions, experiments were performed in a natural circulation loop. A seven tube bundle having a pitch to diameter ratio of 1.25 was used as a test heat exchanger. A circulating flow was established in the loop, because of buoyancy differences between its two vertical legs. Steady state and transient heat transfer measurements were made over as wide a range of thermal conditions as possible with the system. DOE

N83-32011# Oak Ridge National Lab., Tenn. Chemical Technology Div.
LOW-PRESSURE TRANSFER OPERATIONS
J. S. Watson, P. W. Fisher, and J. J. Perona 1982 13 p refs Presented at the Ann. Meeting of Heat Transfer and Energy Conversion, Los Angeles, 14-19 Nov. 1982
(Contract W-7405-eng-26)
(DE83-003443; CONF-821106-14) Avail: NTIS HC A02/MF A01

Low pressure transfer operations were used or proposed which utilize sorption or condensation processes to induce flow. The applications include vacuum pumping, as well as transport of gases between vessels. The unsteady state operation and the coupling of sorption/condensation with the flow rate produce interestingly complex behavior. DOE

N83-32012# Sandia Labs., Albuquerque, N. Mex.
HEAT-TRANSFER CHARACTERISTICS OF DRY POROUS PARTICULATE BEDS WITH INTERNAL HEAT GENERATION
John E. Kelly, John T. Hitchcock, and Michel L. Schwarz Aug. 1982 40 p refs Presented at the ASME Thermal Eng. Conf., Honolulu, Hawaii, 20 Mar. 1982
Avail: NTIS HC A03/MF A01

A combined experimental and analytical program was undertaken to study the thermal characteristics of dry debris beds especially at high temperatures where radiative heat transfer contributes. Experiments were conducted in-pile using intrinsic fission heating of UO2 to simulate decay heat power levels. Both pure UO2 and mixed UO2/steel beds in a helium atmosphere were studied. Temperatures as high as 3100 K were attained. Thermocouples and ultrasonic thermometers were used to measure the bed temperatures. Also recent post-test metallographic examinations have revealed useful information on the materials interactions which can be correlated to changes in the thermal behavior of the bed. In addition to the experiments, a number of porous medium thermal conductivity models were evaluated. From these, two models representing upper and lower bounds for the conductivity, in conjunction with a two dimensional heat transfer analysis were compared to the data. DOE

N83-32013# Brookhaven National Lab., Upton, N. Y. Experimental Modeling Group.
EXPERIMENTAL AND ANALYTICAL STUDY OF NATURAL-CONVECTION HEAT TRANSFER OF INTERNALLY HEATED LIQUIDS
George Alanson Green Aug. 1982 105 p refs
(Contract DE-AC02-75CH-00016)
(DE83-005384; NUREG/CR-2939; BNL-NUREG-51585) Avail: NTIS HC A06/MF A01

Boundary heat transfer from a liquid pool with a uniform internal heat source to a vertical or inclined boundary was investigated. The experiments were performed in an open rectangular liquid pool in which the internal heat source was generated by electrical heating. The local heat flux was measured to a boron nitride test wall which was able to be continuously inclined from vertical. Gold plated microthermocouples of 0.01 inch outside diameter were developed to measure the local surface temperature, both front and back, of the boron nitride. The local heat flux and, thus, the local heat transfer coefficient was measured at nineteen locations along the vertical axis of the test plate. A theoretical analysis of the coupled nonlinear boundary layer equations was performed. The parametric effect of the Prandtl number and the dimensionless wall temperature on the boundary heat transfer were investigated. DOE

N83-32014# California Univ., Berkeley. Lawrence Berkeley Lab. Earth Sciences Div.
ANALYSIS OF FIELD-PERFORMANCE DATA ON SHELL-AND-TUBE HEAT EXCHANGERS IN GEOTHERMAL SERVICE
P. T. Doyle (Heat Transfer Consultants, Inc.) and L. F. Silvester Sep. 1982 38 p refs Presented at the Ann. Meeting of Heat Transfer and Energy Conversion, Los Angeles, 14 Nov. 1982
(Contract DE-AC03-76SF-00098)
(DE83-001564; LBL-14160-REV; CONF-821106-11-REV) Avail: NTIS HC A03/MF A01

Problems encountered in supercritical heat transfer calculations are discussed. Data evaluation models and results for primary heaters and condenser are presented. Results cover predicted areas, overall heat transfer coefficients, shell side film coefficients, mean temperature differences, pinch points, shell side pressure drops, and condensing coefficients. Test results are for isobutane and mixtures of isobutane/isopentane. DOE

N83-32015# California Univ., Berkeley. Lawrence Berkeley Lab. Passive Research and Development Group.
CONVECTION COEFFICIENTS AT BUILDING SURFACES
Ronald C. Kammerud, Emmanuel Altmayer, Fred Bauman, Ashok Gadgil, and Mark Bohn (Midwest Research Inst.) Sep. 1982 15 p refs Presented at the Passive and Hybrid Solar Energy Update Conf., Washington, 15 Sep. 1982
(Contract DE-AC03-76SF-00098)
(DE83-002572; LBL-14947; CONF-820940-7) Avail: NTIS HC A02/MF A01

Correlations relating the rate of heat transfer from the surfaces of rooms to the enclosed air are being developed, based on empirical and analytic examinations of convection in enclosures. The correlations express the heat transfer rate in terms of boundary conditions relating to room geometry and surface temperatures. Work to date indicates that simple convection coefficient calculation techniques can be developed, which significantly improve accuracy of heat transfer predictions in comparison with the standard calculations recommended by ASHRAE. DOE

N83-32016# Massachusetts Inst. of Tech., Cambridge. School of Chemical Engineering Practice.
PREDICTION OF PRESSURE DROP OF TWO-PHASE COAL SLURRIES IN PIPELINES
Sunil M. Sanghvi and Jeffrey S. Tolan Nov. 1982 82 p refs
(Contract W-7405-eng-26)
(DE83-003382; ORNL/MIT-349) Avail: NTIS HC A05/MF A01

Pressure drop and flow rate measurements through pipeline viscometers were analyzed using the power law, Bingham-plastic and Bowen non-Newtonian heological models in a computer program. Wall slip was corrected with Hanks' modification of the Rabinowitsch-Mooney equation. The possibility of solids settling was analyzed with the Oroskar-Turian correlation. The program relates shear stress to shear rate for Fort Lewis coal-slurry data to within 5% for flow without solids settling. Wilsonville coal-slurry data with solids settling were fit to within 17% by the Bowen model, but the Bowen parameters are very sensitive to operating conditions. Pressure drop is predicted in the program as a function of flow rate and pipe diameter, using the analysis of best-fit rheological parameters and literature correlations for friction factors. The effect of wall slip on shear stress decreased with increasing pipe diameter. A modification to the graphical criterion for turbulence was proposed that utilizes the numerical value of the slopes of the branched flow curves. DOE

N83-32017# California Univ., Berkeley. Lawrence Berkeley Lab. Passive Research and Development Group.
CONVECTIVE HEAT TRANSFER IN BUILDINGS: RECENT RESEARCH RESULTS
Fred Bauman, Ashok Gadgil, Ronald C. Kammerud, Emmanuel Altmayer, and Mark Nansteel Apr. 1982 50 p refs Presented at the ASHRAE Semiann. Meeting, Atlantic City, 23 Jan. 1983
(Contract W-7405-eng-48)
(DE83-015706; LBL-13883; CONF-830102-1) Avail: NTIS HC A03/MF A01

Small scale water filled enclosures were used to study convective heat transfer in buildings. The convective processes investigated are: (1) natural convective heat transfer between room surfaces and the adjacent air; (2) natural convective heat transfer between adjacent rooms through a doorway or other openings; and (3) forced convection between the building and its external environment (such as, wind driven ventilation through windows, doors, or other openings). Results for surface convection coefficients are compared with existing ASHRAE coorelations and differences of as much as 20% are observed. Numerical simulations of wind driven natural ventilation exhibit good qualitative agreement with published wind tunnel data. DOE

N83-32018# California Univ., Berkeley. Lawrence Berkeley Lab.
TURBULENT BOUNDARY LAYER OVER A FLAT PLATE WITH STRONG STEPWISE HEATING
T. T. Ng, L. Talbot, and F. Robben Jul. 1982 14 p refs Presented at the Intern. Symp. on Appl. of Laser-Doppler Anemometry to Fluid Mech., Lisbon, 5-7 Jul. 1982
(Contract DE-AC03-76SF-00098)
(DE83-001554; LBL-14942; CONF-820706-3) Avail: NTIS HC A02/MF A01

The turbulent boundary layer over a flat plate with stepwise wall temperature rise from room temperature to 1250 K and free

stream velocity of 10.5 m/s was studied. Thermal structures in the heated boundary layer were observed using high speed schlieren cine. Mean and rootmean-square (rms) density distributions were obtained from Rayleigh scattering intensity measurements. Velocity statistics were provided by a single component laser Doppler velocimetry system. Mean and rms velocity profiles, the Reynolds stress, the streamwise and the cross stream turbulent kinetic energy diffusion were determined. Data were collected by a computer based data acquisition and control system. The overall shape of the thermal structures observed in the schlieren pictures of the heated boundary layer is similar to that of the large scale turbulent structures in an isothermal turbulent boundary layer.DOE

N83-32019# Argonne National Lab., Ill.
LIQUID TRANSFER AND ENTRAINMENT CORRELATION FOR DROPLET-ANNULAR FLOW
M. Ishi and K. Mishima (Kyoto Univ., Osaka) 1982 7 p refs Presented at 7th Intern. Heat Transfer Conf., Munich, 6 Sep. 1982
(Contract W-31-109-eng-38)
(DE83-007703; CONF-820901-7) Avail: NTIS HC A02/MF A01

A correlation for the amount of entrained liquid in annular flow has been developed from a simple model and experimental data. There are basically two different regions of entrainment, namely, the entrance and quasi-equilibrium regions. The correlation for the equilibrium region is expressed in terms of the dimensionless gas flux, diameter, and total liquid Reynolds number. The entrance effect is taken into account by an exponential relaxation function. It has been shown that this new model can satisfactorily correlate wide ranges of experimental data for water. Furthermore, the necessary distance for the development of entrainment is identified. These correlations, therefore, can supply accurate information on entrainment which has not been available previously. DOE

N83-32020# Los Alamos Scientific Lab., N. Mex.
CONCEPTUAL DESIGNS FOR 100-MW SPACE RADIATORS
F. C. Prenger and J. A. Sullivan 1982 35 p refs Presented at the Am. Nucl. Soc. Winter Meeting, Advan. Nucl. Systems Symp., Washington, D.C., 14 Nov. 1982
(Contract W-7405-eng-36)
(DE83-003542; LA-UR-82-3279; CONF-821103-50) Avail: NTIS HC A03/MF A01

A description and comparison of heat rejection systems for multimegawatt space-based power supplies is given. concepts are described, and through a common performance parameter, these are compared with three advanced radiator concepts. The comparison is based on a power system that rejects 100 MW of heat while generating 10 MW of electrical power. DOE

N83-32021# Oak Ridge National Lab., Tenn.
THE APPLICABILITY OF EARTH COUPLED HEAT PUMPS AND FACTORS AFFECTING THEIR PERFORMANCE
Paul R. Intemann and P. D. Fairchild 1982 14 p refs Presented at the 5th Intern. Conf. on Alternative Energy Source, Miami Beach, Fla., 13 Dec. 1982
(Contract W-7405-eng-26)
(DE83-004616; CONF-821213-3) Avail: NTIS HC A02/MF A01

Earth coupled heat pumps are closed-loop systems placed underground to take advantage of favorable thermal characteristics of the subsurface. Design concepts have been divided into three categories: shallow horizontal coils, multiple shallow wells, and single deep wells. In some areas earth coupled heat pumps offer the potential of more efficient heating and cooling of buildings than conventional heat pumps, and they may be applicable in places where groundwater heat pumps and conventional geothermal development are not. Heat transfer occurs primarily by conduction making the thermal conductivity of the subsurface a critical factor in determining the performance of earth coupled heat pumps. Thermal conductivity is dependent on porosity, moisture content, and the mineralogy of the solid phase. The cost of drilling or excavating into the subsurface and installing the system is an important element of the overall cost. DOE

N83-32022# Oak Ridge National Lab., Tenn.
STUDY OF HEAT AND MASS TRANSFER IN A VERTICAL-TUBE EVAPORATIVE COOLER
Horacio Perez-Blanco and William A. Bird 1982 24 p refs Presented at the ASME Winter Ann. Meeting., Phoenix, Ariz., 14 Nov. 1982
(Contract W-7405-eng-26)
(DE83-003480; CONF-821101-16) Avail: NTIS HC A02/MF A01

Evaporative coolers are three-fluid heat exchangers employed for heat rejection to the environment. A mixture of air and recirculating water is used as the cooling medium. These coolers are considered viable routes for improving thermal efficiencies of power-generating and refrigeration cycles. The heat- and mass-transfer processes taking place in a vertical-tube evaporative cooler are studied. A steady-state, one dimensional model of cooler performance is formulated. This model is validated by experimental measurements, taken in a single-tube exchanger, of the controlling heat- and mass-transfer coefficients. These coefficients occur at the air-water interface. Heat fluxes and enhancement ratios for conditions of interest are measured and calculated, and the results are compared and discussed. The model is found to adequately predict heat-exchanger performance. DOE

N83-32023# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.
APPLICATION OF THE ESCIMO THEORY TO TURBULENT DIFFUSION FLAMES Ph.D. Thesis
R. L. T. Sun Sep. 1982 368 p refs Sponsored by Safety in Mines Research Establishment
(CFD/82/7) Avail: NTIS HC A16/MF A01

In order to asses the validity of the ESCIMO theory for turbulent diffusion flames, predictions and measurements of the diffusion limited chemical reaction in a turbulent mixing layer; the hydrogen-air diffusion flame in coflowing air; and the natural gas-air free jet diffusion flame are compared. The mean velocity and the turbulent kinetic energy; the population distribution function of various folds; the variation of mean temperature and species concentration across the mixing layer or jet; the rms fluctuation of temperature and species concentration; and the probability density function of temperature and species concentration are obtained. Agreement between prediction and measurement are good, but inclusion of turbulence intermittency in the theory is advocated. Author (ESA)

N83-32024# Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway). Dept. of Science and Technology.
TRANSMISSION OF AN EXPLOSION THROUGH AN ORIFICE
P. Thibault, Y. K. Liu, C. Chan, J. H. Lee, R. Knystautas, C. Gurap, B. H. Hjertager, and K. Fuhre Sep. 1982 28 p refs Presented at the 19th Intern. Symp. on Combustion, Haifa, Israel, 8-13 Aug. 1982 Sponsored by BP Petroleum Ltd., Elf Aquitaine Norge A/S, Esso Exploration and Production Norway, Inc., Mobil Exploration Norway, Inc., Norsk Hydro and Statoil Prepared in cooperation with McGill Univ.
Avail: NTIS HC A03/MF A01 CSCL 19D

The problem of transmission of an explosion from one chamber to another through an orifice was studied for methane, propane, hydrogen and acetylene mixtures with air. Quenching diameters are determined for various regimes. GRA

N83-32025# Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway). Dept. of Science and Technology.
BLAST WAVE DECAY FROM AN EXPLODING HEMISPHERICAL GAS CLOUD
Jan Roar Blakke and Bjoern H. Hjertager Dec. 1981 29 p refs (PB83-177857; CMI-813403-4) Avail: NTIS HC A03/MF A01 CSCL 19D

Numerical calculation of the blast wave decay from an exploding hemispherical gas cloud is performed by using the Brinkley-Kirkwood method. Initial conditions are computed (for the deflagrative mode) using the exact self-similar solution of Taylor. GRA

N83-31638# Polytechnical Univ. of Madrid (Spain). Lab. of Aerodynamics.
FLUID PHYSICS UNDER REDUCED GRAVITY: AN OVERVIEW
I. Da-Riva and L. G. Napolitano (Naples Univ.) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 5-12 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31643# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Space Stimulation.
THERMOCAPILLARY MIGRATION OF BUBBLES IN LIQUIDS SHOWING RELAXATION OF SURFACE TENSION
A. Bewersdorff *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 41-44 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31644# Universidad Politecnica de Madrid (Spain). E.T.S.I. Industriales.
BUBBLE MOTION UNDER REDUCED GRAVITY
A. Crespo and F. Manuel *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 45-49 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31645# Centre National de la Recherche Scientifique, Meudon (France). Lab. d'Aerothermique.
ON THERMALLY-DRIVEN MOVEMENT OF DROPS IN MICROGRAVITY CONDITIONS
A. ElKouraychi, F. Feuillebois, and A. Lasek *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 51-54 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31647# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Space Simulation.
THE BEHAVIOR OF A METALLIC DISPERSION UNDER MICROGRAVITY CONDITIONS
G. H. Otto *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 63-69 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31651# European Space Research and Technology Center, Noordwijk (Netherlands).
THE FLUID PHYSICS MODULE: NEW POSSIBILITIES AND APPLICATIONS
A. Gonfalone and H. Martinides *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 95-97 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31654# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
HEAT TRANSFER INDUCED PERFORMANCE CHARACTERISTICS OF GRADIENT TYPE FURNACES
P. Behrmann and R. Benz *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 109-115 (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31661# Lyon-1 Univ., Villeurbanne (France).
STATIONARY AND OSCILLATORY INSTABILITIES FOR MIXTURE SUBJECTED TO SORET EFFECT IN VERTICAL CYLINDER WITH AXIAL TEMPERATURE GRADIENT
D. Henry and B. Roux (Inst. de Mecanique des Fluides, Marseille) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 145-152 refs Sponsored by CNES (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31668# Brussels Univ. (Belgium). Chimie-Physique EP.
STUDY OF THE SURFACE TENSION MINIMUM OF AQUEOUS ALCOHOL SOLUTIONS AND MOVEMENTS AT THE AIR-SOLUTION INTERFACE
G. Petre, M. Cl. Limbourg-Fontaine, and J. C. Legros *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 199-200 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31669# Brussels Univ. (Belgium). Chimie-Physique EP.
THE INFLUENCE ON THE MARANGONI EFFECT OF A SURFACE TENSION MINIMUM AS A FUNCTION OF TEMPERATURE IN MICROGRAVITY CONDITIONS
J. C. Legros, G. Petre, and M. Cl. Limbourg-Fontaine *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 201-203 refs Sponsored by Fondation Universitaire D. et A. Van Buuren and Fonds National de la Recherche Scientifique (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31670# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany).
FREE-SURFACE VIBRATION OF A FLOATING ZONE INDUCED BY SURFACE TENSION DRIVEN OSCILLATING FLOW
Ch.-H. Chun, W. Wuest, and J. Siekmann (Essen Univ.) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 205-211 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31671# Giessen Univ. (West Germany). Inst. fuer Physik.
MEASUREMENT OF THE CRITICAL MARANGONI NUMBER IN A FLOATING ZONE UNDER REDUCED GRAVITY
D. Schwabe and A. Scharmann *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 213-218 refs (For primary document see N83-31637 20-12)
(Contract BMFT-01-QV-148-ZA-SN-SLN-7786)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31672# Naples Univ. (Italy). Inst. of Aerodynamics.
INFLUENCE OF GEOMETRY ON OSCILLATORY MARANGONI FLOWS
R. Monti, L. G. Napolitano, and G. Russo *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 219-228 refs Sponsored by CNR, MPI and Company LABEN S.p.A., Milan (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31673# Naples Univ. (Italy). Inst. of Aerodynamics U. Nobile.
INFLUENCE OF SURFACE TENSION MINIMUM ON SURFACE AND BUOYANCY DRIVEN FLOWS IN STOKES REGIME
L. G. Napolitano and C. Golia *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 229-233 refs (For primary document see N83-31637 20-12)
(Contract CNR-82/002/SAS)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31674# Madrid Univ. (Spain). Fisica Fundamental.
BUOYANCY-THERMOCAPILLARY CONVECTION: THE ROLE OF INTERFACIAL DEFORMATION
M. G. Velarde and J. L. Castillo *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 235-237 refs Sponsored by Spanish Comision Asesora de Investigacion Cientifica y Tecnica (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31675# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Mechanical and Aerospace Engineering.
NUMERICAL SOLUTIONS OF FLOATING-ZONE THERMOCAPILLARY FLOWS
Being-I Fu and S. Ostrach *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 239-245 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31676# Universidad Politecnica de Madrid (Spain). Inst. of Aeronautics.

ALMOST CYLINDRICAL ISOROTATING LIQUID BRIDGES FOR SMALL BOND NUMBERS
J. M. Vega and J. M. Perales *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 247-252 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31677# Universidad Politecnica de Madrid (Spain). Lab. de Aerodinamica.
CONSERVATION LAWS FOR LIQUID BRIDGES
I. Da-Riva *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 253-260 refs Sponsored by Spanish Space Research Commission (CONIE) (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31678# Universidad Politecnica de Madrid (Spain). Lab. de Aerodinamica.
THE BREAKING OF AXISYMMETRIC NONCYLINDRICAL LIQUID BRIDGES
J. Meseguer, A. Sanz, and D. Rivas *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 261-265 refs Sponsored by Spanish Space Research Commission (CONIE) (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31679# Universidad Politecnica de Madrid (Spain). Inst. of Aeronautics.
STABILITY OF AXISYMMETRIC LIQUID BRIDGES
I. Martinez *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 267-273 refs Sponsored by Spanish Commission for Space Research (CONIE) (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31682# Erlangen-Nuremberg Univ. (West Germany). Inst. fuer Werkstoffwissenschaften, Kristallabor.
INVESTIGATION OF CONVECTIVE FLOWS IN MODEL SYSTEMS OF DIRECTIONAL SOLIDIFICATION CONFIGURATIONS
G. Mueller and G. Neumann *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 285-294 refs Sponsored by Bundesministerium fuer Forschung und Technologie (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31694# Battelle Inst., Frankfurt am Main (West Germany).
OSCILLATORY CONVECTION IN A SPHERICAL CAVITY DUE TO g-JITTER
D. Langbein *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 359-363 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-32481# Metropolitan Coll. of Technology, Tokyo (Japan).
SELF-SEMILAR SOLUTIONS OF HYDRODYNAMIC EQUATIONS FOR EXPANDING LAYER WITH BOUNDARY CONDITION SPECIFIED BY DIFFERENTIAL EQUATION
Hiroyuki Murakami, Moritake Tamba (Inst. of Physical and Chemical Research), and Keishiro Niu (Tokyo Inst. of Technology) *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 1-7 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32485# Kyushu Univ., Fukuoka (Japan). Dept. of Aeronautical Engineering.
GENERATION OF ORTHOGONAL, BOBY-FITTED GRIDS USING POTENTIAL FLOW SOLUTION BY THE PANEL METHOD
Masanori Hayashi, Akira Sakurai, and Masashi Nagahata *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 33-40 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32498# Kyoto Univ. (Japan). Dept. of Aeronautical Engineering.
TRANSLATION NONEQUILIBRIUM IN A RAPID EXPANSION FLOW FROM A HIGH TEMPERATURE SOURCE
Koji Teshima, Tomio Moriya, and Norio Takahashi *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 179-185 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32504# Tsukuba Univ. (Japan). Inst. of Engineering Mechanics.
FLOW FIELD VISUALIZATION OF VAPOR CONDENSATION IN THE ENCLOSURE
Yasunori Kobayashi, Mamoru Kaneko, and Tsuyoshi Matsumoto *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 241-245 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32505# Seikei Univ., Tokyo (Japan). Dept. of Mechanical Engineering.
STUDIES ON CONDENSATION HEAT TRANSFER IN TWO-PHASE CLOSED THERMOSYPHONS
Masao Takuma, Saburo Maezawa, and Akira Tsuchida *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 247-255 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32506# Osaka Perfecture (Japan). Dept. of Aeronautical Engineering.
UNSTABLE PHENOMENA IN A TWO-PHASE CLOSED THERMOSYPHON
Kanji Negishi *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 257-263 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32507# Toshiba Research and Development Center, Kawasaki (Japan). Research and Development Center.
THE COOLING UNIT FOR THE CLOSED BOX
Toshio Yasunaga and Hisao Koizumi *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 265-271 (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32508# National Research Inst. for Pollution and Resources, Tokyo (Japan).
HEAT TRANSFER RATE OF LOOPED TYPE HEAT PIPES USING WATER AND NAK AS WORKING FLUID UNDER LIQUID PHASE FLOW
Yoshio Tanaka, Tadashi Yamamoto, and Hisao Hattori (Technological Univ. of Nagaoka) *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 273-281 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

N83-32026* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
VIBRATION ISOLATION AND PRESSURE COMPENSATION APPARATUS FOR SENSITIVE INSTRUMENTATION Patent
Robert D. Averill, inventor (to NASA) Issued 26 Jul. 1983 6 p

Filed 16 Aug. 1982 Supersedes N83-12398 (21 - 03, p 0371)
(NASA-Case-LAR-12728-1; US-Patent-4,394,819;
US-Patent-Appl-SSN-408575; US-Patent-Class-62-514R; US-Patent-Class-62-295; US-Patent-Class-248-636; US-Patent-Class-248-638) Avail: US Patent and Trademark Office CSCL 14B

A system for attenuating the inherent vibration associated with a mechanical refrigeration unit employed to cryogenically cool sensitive instruments used in measuring chemical constituents of the atmosphere is described. A modular system including an instrument housing and a reaction bracket with a refrigerator unit floated there between comprise the instrumentation system. A pair of evacuated bellows that 'float' refrigerator unit and provide pressure compensation at all levels of pressure from seal level to the vacuum of space. Vibration isolators and when needed provide additional vibration damping for the refrigerator unit. A flexible thermal strap (20 K) serves to provide essentially vibration free thermal contact between cold tip of the refrigerator unit and the instrument component mounted on the IDL mount. Another flexible strap (77 K) serves to provide vibration free thermal contact between the TDL mount thermal shroud and a thermal shroud disposed about the thermal shaft.

Official Gazette of the U.S. Patent and Trademark Office

N83-32027*# Naval Research Lab., Washington, D. C. Atmospheric Physics Branch.

CONTACT-POTENTIAL AND SURFACE-CHARGE EFFECTS IN ATMOSPHERIC-ELECTRICAL INSTRUMENTATION

J. C. Willett and J. C. Bailey 26 Apr. 1983 54 p refs
(NASA Order H-46856-B; NASA Order L-4703-B; RR0330242)
(NASA-CR-172834; NAS 1.26:172834; AD-A127865;
NRL-MR-5063) Avail: NTIS HC A04/MF A01 CSCL 14/2

Various investigators have noted deleterious effects on atmospheric electrical measurements due to contact potentials between different metal parts of the apparatus. A less familiar error source of comparable magnitude arises from charge patches which apparently can be deposited on thin insulating films common to the surfaces of many metals. These phenomena seem never to have been studied in the atmosphere, where variable humidity and surface contamination complicate the situation. Two laboratory experiments have been conducted to investigate those error sources with a view toward minimizing their effects by suitable choice of materials. The contact potentials between various metal plates before and after weathering were measured by the nulling potentiometer method in an ionization chamber. The local Volta-potential perturbations due to artificially deposited surface-charge patches were measured on several metal plates by spinning them on a lathe. Of the metals tested, stainless steel and rhodium plate were found to be the best in almost all respects. Surprisingly, gold-plated samples exhibited particularly large variability and sensitivity to weathering. Author (GRA)

N83-32028*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

HALOGEN OCCULTATION EXPERIMENT (HALOE) GAS CELL LIFE TEST PROGRAM

Edward M. Sullivan, Robert E. Thompson (Systems and Applied Sciences Corp., Hampton, Va.), Gale A. Harvey, Jae H. Park, and D. J. Richardson Aug. 1983 74 p refs
(NASA-TM-84640; L-15581; NAS 1.15:84640) Avail: NTIS HC A04/MF A01 CSCL 13B

The Halogen Occultation Experiment (HALOE) will use gas filter correlation radiometry to measure the atmospheric concentration profiles of HCl, HF, NO, and CH4 from the Upper Atmosphere Research Satellite. The need to contain the gases for the gas filter measurements has resulted in the development of gas cells and the need for a life test program to demonstrate that the gas cells will perform their functions for extended periods (several years) of time. This report describes the tests in the life test program, the test apparatus used, and the analysis techniques developed. The report also presents data obtained during the first 14 months of the test program. Author

N83-32029# Naval Postgraduate School, Monterey, Calif.

HOLOGRAPHIC INVESTIGATION OF SOLID PROPELLANT COMBUSTION PARTICULATES M.S. Thesis

Douglas E. Faber Mar. 1983 38 p refs
(AD-A127841) Avail: NTIS HC A03/MF A01* CSCL 21/9

Pulsed holography was used to examine solid propellant combustion in a realistic cross flow environment created by two opposed, end-inhibited propellant slabs in a two dimensional motor. The use of a pulsed ruby laser made possible the photographing of high velocity particles without blurring. Advantages and disadvantages of this technique are discussed, as well as alternatives. R.J.F.

N83-32030# Air Force Weapons Lab., Kirtland AFB, N. Mex. Civil Engineering Research Div.

AUTOMATED INSTRUMENTATION SYSTEM VERIFICATION Final Report

Josef F. Schneider Apr. 1983 95 p refs
(AF Proj. 672A)
(AD-A127775; AFWL-TR-82-137) Avail: NTIS HC A05/MF A01 CSCL 14/2

This report describes the efforts and results of automating systems verification for the instrumentation equipment used in high explosives testing. A complete checkout of instrumentation channels from sensor connection to, and including, data reduction is achieved by measuring linearity, frequency response, and dynamic range simultaneously of as large a group of channels as is practical at one time. Inputs are a triangular wave signal and a noise signal. The checkout data are recorded in the same way as test data. A table that is ordered by recorder track and voltage controlled oscillator center frequencies is produced in the course of the computer program to contain percent linearity, 3 dB bandwidth, percent deviation from standard bandwidth, dynamic range in decibels, and noise floor in millivolts for every channel measured. Hardcopy plots of the nonlinearity deviations, the frequency response, and the noise floor spectrum can be produced during processing when requested. The computer program is friendly, the order of channel measurements can be completely arbitrary, repeated measurements replace the respective previous entries. GRA

N83-32031# Aeronautical Research Labs., Melbourne (Australia).

OPERATING INSTRUCTIONS MANUAL FOR MICROPROCESSOR AIRBORNE DATA ACQUISITION AND REPLAY (MADAR) MODULE

J. F. Harvey, C. W. Sutton, and I. M. Kerton Feb. 1983 29 p ref
(AD-A128558; ARL/AERO-TM-347) Avail: NTIS HC A03/MF A01 CSCL 14/3

This user's manual details the operating instructions for MADAR which is a 16 channel analogue input, digital cassette recording system with programmable facilities. Selected data are able to be scaled and periodically displayed on liquid crystal displays. GRA

N83-32032# IBM Research Lab., San Jose, Calif.

HOLOGRAPHIC METHODS FOR THE INVESTIGATION OF PHOTOPHYSICAL PROPERTIES

Chr. Braeuchle (Munich Univ.) and D. M. Burland 22 Apr. 1983 63 p refs Submitted for publication
(Contract N00014-81-C-0418; NR Proj. 051-782)
(AD-A128510; TR-4) Avail: NTIS HC A04/MF A01 CSCL 07/5

Holography is most frequently thought of as a method of photography that results in three dimensional images of the object being photographed. Holography is also used as a powerful tool for the investigation of a variety of photochemical and photophysical processes. These experimental techniques rely on the fact that small spatial modulations of the materials optical properties (index of refraction and absorption coefficient) defect an incident light beam into another direction. By following the growth or decay in intensity, the underlying physical process producing the changes in optical properties is followed. If a continuous wave laser is used to produce the hologram one uses the technique to investi-

gate solid state photochemistry. If a pulsed laser is used, a broad range of time dependent processes are investigated. Author

N83-32033# National Bureau of Standards, Washington, D.C. Sychrotron Ultraviolet Radiation Facility.

PHOTOELECTRON SPECTROMETER FOR HIGH-RESOLUTION ANGULAR RESOLVED STUDIES

Albert C. Parr, Stephen H. Southworth, Joseph L. Dehner (Argonne National Lab., Ill.), and David M. P. Holland (Maryland Univ., College Park) 1982 11 p refs Presented at the Intern. Conf. on X-ray and VUV Synchrotron Radiation Instrumentation, Hamburg, 9 Aug. 1982

(Contract W-31-109-eng-38)

(DE83-008687; CONF-820829-7) Avail: NTIS HC A02/MF A01

A new electron spectrometer system designed for use n storage-ring light sources is described. The system features a large (76 cm dia. x 92 cm long) triply magnetically shielded vacuum chamber and two 10.2 cm mean radius hemispherical electron-energy analyzers. One of the analyzers is fixed and the other is rotatable through about 150 deg. The chamber is pumped by a cryopump and a turbomolecular pump combination so as to enable experiments with a variety of gases under different conditions. The light detection includes both a direct beam monitor and polarization analyzer. The electron detectron is accomplished with either a continuous-channel electron multiplier or with multichannel arrays used as area detectors. DOE

N83-32034# Sandia Labs., Albuquerque, N. Mex.

GEOTECHNICAL INSTRUMENTATION REQUIREMENTS FOR AT-DEPTH TESTING AND REPOSITORY MONITORING IN TUFF

R. M. Zimmerman 1982 16 p refs Presented at IEEE Nucl. Sci. Symp., Washington, D.C., 20 Oct. 1982

(Contract DE-AC04-76DP-00789)

(DE83-002188; SAND-82-1650C; CONF-821011-15) Avail: NTIS HC A02/MF A01

Minimum required geotechnical measurements for confirmation of repository performance include thermal and thermomechanical responses; changes in stress, strain, and displacements; and pore pressure and groundwater flow characteristics. Conditions expected in tuff are: maximum rock temperatures of less than 250 C, stresses less than 100 MPa, strains between +-0.01 mm/mm, and pore pressures less than 35 KPa in the unsaturate zone where hydraulic head is not the primary contributor. The paper describes instrumentation needed to make the desired measurements. In general, the instrumentation and data system are required measurements. In general, the instrumentation and data system are required to be stable and reliable for tens of years. Designs must consider requirements for temperature stability, temperature expansion compensation, moisture resistance, and long-term durability in mining-type environments. Severe requirements such as these suggest consideration of techniques for in-situ replacement of instrumentation. State-of-the-art instrumentation is briefly described along with a discussion of needs for refinement, replacement/recalibration and instrumentation development. DOE

N83-32035# Oak Ridge National Lab., Tenn. Fusion Energy Div.

OAK RIDGE BEAM-ANALYSIS SYSTEM

C. R. Stewart, W. K. Dagenhart, and L. B. Maddox Nov. 1982 20 p refs

(Contract W-7405-eng-26)

(DE83002587; ORNL/TM-8452) Avail: NTIS HC A02/MF A01

The design and development of powerful neutral beam lines for heating the plasma in fusion reactors is discussed. The data acquisition and analysis system for the neutral beam test stands monitors source performance, beam characteristics, and power deposition profiles to determine if a beam line is operating according to its design specifications. The speed of the computer system is utilized to provide near real time analysis of experimental data. In addition, the data acquisition systems are linked to the fusion energy division (FED) PDP-10 timesharing computer, where data may be permanently stored and/or further analyzed. DOE

N83-32036# Los Alamos Scientific Lab., N. Mex.

LASER-BASED INSTRUMENTATION FOR THE DETECTION OF CHEMICAL AGENTS

A. Harford, Jr., R. K. Sander, G. P. Quigley, L. J. Radziemski, and D. A. Cremers 1982 23 p refs Presented at Chem. Defense Res. Conf., Aberdeen Proving Ground, Md., 15 Nov. 1982

(Contract W-7405-eng-36)

(DE83-003538; LA-UR-82-3284; CONF-821146-1) Avail: NTIS HC A02/MF A01

Several laser based techniques are evaluated for the remote, point, and surface detection of chemical agents. Among the methods under investigation are optoacoustic spectroscopy, laser induced breakdown spectroscopy (LIBS), and synchronous detection of laser induced fluorescence (SDLIF). Optoacoustic detection was already shown to be capable of extremely sensitive point detection. Its application to remote sensing of chemical agents is currently evaluated. Atomic emission from the region of a laser generated plasma was used to identify the characteristic elements contained in nerve (P and F) and blister (S and Cl) agents. Employing this LIBS approach, detection of chemical agent simulants dispersed in air and adsorbed on a variety of surfaces was achieved. Synchronous detection of laser induced fluorescence provides an attractive alternative to conventional LIF, in that an artificial narrowing of the fluorescence emission is obtained. DOE

N83-32037# Edgerton, Germeshausen and Grier, Inc., Goleta, Calif.

RECENT DEVELOPMENTS IN THICK MERCURIC IODIDE SPECTROMETERS

K. Hull, A. Beyerle, B. Lopez, J. Markakis, C. Ortale, W. Schnepple, and L. vandenBerg 1982 3 p refs Presented at the IEEE Nucl. Sci. Symp., Washington, D.C., 20 Oct. 1982

(Contract DE-AC08-76NV-01183)

(DE83-003007; CONF-821011-41) Avail: NTIS HC A02/MF A01

Thick (approx. 1 cm) mercuric iodide gamma-ray detectors have been produced which show spectroscopic qualities at moderate detector biases (approx. 5 kV) comparable to those of thin spectrometers. Efficiency measurements indicate that the entire volume of the detectors is active. Spectra resolutions of less than 10% have been obtained for gamma-ray energies above 1 MeV. Short charge collection times have produced the best results. Measurement of crystal charge transport properties is discussed. A small amount of bias conditioning is necessary for best performance. Operating parameters of the detectors have been investigated. DOE

N83-32038# Los Alamos Scientific Lab., N. Mex.

MINI-MCA: AN INTELLIGENT INSPECTION INSTRUMENT

James K. Halbig and Shirley F. Klosterbuer 1982 25 p refs Presented at the Intern. Symp. on Recent Advances in Nucl. Mater. Safeguards, Nienna, Australia, 8-12 Nov. 1982

(Contract W-7405-eng-36)

(DE83-001979; LA-UR-82-2843; CONF-821119-8) Avail: NTIS HC A02/MF A01

The small portable multichannel analyzer (Mini-MCA) designed at Los Alamos National Laboratory is an intelligent safeguards instrument developed for the IAEA under the United States Air Program. The Mini-MCA is a basic 1-k channel MCA that features a high degree of user friendliness and portability. Its history, use, and future applications are discussed. DOE

N83-32039# Los Alamos Scientific Lab., N. Mex.

AUTOMATED ON-LINE L-EDGE MEASUREMENT OF SNM CONCENTRATION FOR NEAR-REAL-TIME ACCOUNTING

P. A. Russo, T. Marks, Jr., M. M. Stephens, S. T. Hsue, A. L. Baker, and D. D. Cobb 1982 24 p refs Presented at the Intern. Symp. on Recent Advances in Nucl. Mater. Safeguards, Nienna, Australia, 8-12 Nov. 1982

(Contract W-7405-eng-36)

(DE83-000666; LA-UR-82-2649; CONF-821119-5) Avail: NTIS HC A02/MF A01

The L-edge densitometer developed at Los Alamos National Laboratory has been modified, tested, and demonstrated for on-line

assay of special material concentration in flowing solution streams. The demonstration was part of a larger demonstration of near-real-time nuclear materials accounting during a continuous, week-long, cold operation of the Allied General Nuclear Services facility in Barnwell, South Carolina. The L-edge data were automatically analyzed and the results were transmitted to the materials accounting computer once every 5.5 min for the duration of the cold run. This report compares the results of the L-edge analyses with the delayed results obtained from destructive analysis of samples withdrawn from the same process line. Comparisons are also made with the results obtained in near real time from an automated process control instrument installed in series with the L-edge densitometer. The performance of the L-edge instrument was reliable throughout the continuous operation. DOE

N83-32040# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho. Physics Div.
CHARACTERISTICS AND USE OF THE TRANSIENT REACTIVITY METER
W. M. Yarborough Oct. 1982 112 p ref
(Contract DE-AC07-76ID-01570)
(DE83-003726; EGG-PHYS-5297) Avail: NTIS HC A06/MF A01

Reactivity measurements - an essential part of experimental reactor physics - are performed on line using an analog device known as the transient reactivity meter (TRM). The TRM has certain features that set it apart from most other instruments of its kind. These features are described, and procedural information valuable to those who set up and use the TRM in a reactor measurement system are presented. DOE

N83-32041# Brookhaven National Lab., Upton, N. Y.
POLARIZED-NEUTRON SPECTROMETER DEVELOPMENT AND EXPERIMENTS AT BROOKHAVEN
C. F. Majkrzak and G. Shirane Sep. 1982 8 p refs Presented at Intern. Conf. on the Impact of Polarized Neutrons on Solid State Chem. and Phys., Grenoble, France, 15 Oct. 1982
(Contract DE-AC02-76CH-00016)
(DE83-000978; BNL-31917; CONF-821057-1) Avail: NTIS HC A02/MF A01

The development of polarized neutron spectrometers and the resurgence of interest in polarization analysis are described. Both Heusler crystals and FeGe multilayers used in conjunction with pyrolytic graphite crystals were tested as polarizing monochromators on a triple axis instrument. The goal is to first obtain polarized beams of adequate intensity and then to evaluate various instrumental innovations which effect control of spectrometer resolution by utilizing the properties of polarized beams. Magnetic excitations in amorphous ferromagnets employing the instrumentation for polarization analysis developed thus far is also discussed. DOE

N83-32042# National Bureau of Standards, Washington, D.C. National Engineering Lab.
SEMIAUTOMATIC AC/DC THERMAL VOLTAGE CONVERTER CALIBRATION SYSTEM Final Report
K. J. Lentner and S. G. Tremaine Sep. 1982 64 p refs Sponsored in part by Department of Defense Calibration Coordination Group
(PB83-180224; NBSIR-82-2576) Avail: NTIS HC A04/MF A01 CSCL 14B

A semiautomatic ac/dc difference calibration system is described. The system operates overa frequency range of 20 Hz to 100 kHz, covering the voltage range from 0.5 V to 1 kV. For all voltages at frequencies in the range from 20 Hz to 20 kHz, the total uncertainty is 50 parts per million (ppm), and 100 ppm for voltages at frequencies between 20 kHz and 100 kHz. In addition to ac/dc difference testing, the system is readily adapted to calibrate precision ac digital voltmeters or ac calibrators. Results of extensive intercomparison testing of the new system against a manual test system are reported, using a multirange thermal transfer instrument as a transport standard. The results indicate that the ac/dc differences measured are well within the combined total uncertainty limits of the two systems. GRA

N83-32043# Electricity Council Research Centre, Capenhurst (England).
NEGATIVE PHASE SEQUENCE RECORDER BASED ON A SINGLE CHIP MICROCOMPUTER
S. J. Kearley and J. E. Smith (Yorkshire Electricity Board) Aug. 1982 10 p refs Presented at the I.E.E. Conf., 5 May 1982
(PB83-184689; ECRC/M-1581) Avail: NTIS HC A02/MF A01 CSCL 09C

An investigation was conducted into the use of a negative phase sequence recorder for improving the voltage balance of a power system so as to reduce overheating and increase efficiency. It was considered that conventional recorders giving no phase information were inadequate. An improved instrument specification, based on an existing single chip microcomputer board, was proposed and developed for this application. Field trials were conducted on a typical rural system and the results presented in the form of polar plots. The instrument was used to obtain accurate measurements of amplitude and phase of negative phase sequence voltage. The microcomputer proved to be an economical solution, but required selection of a suitable algorithm to match its limited capacity. GRA

36 LASERS AND MASERS

Includes parametric amplifiers.

N83-32044*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SOLAR-SIMULATOR-PUMPED ATOMIC IODINE LASER KINETICS
Hon W. Wilson, S. Raju, and Y. J. Shiu Aug. 1983 17 p refs
(NASA-TP-2182; L-15615; NAS 1.60:2182) Avail: NTIS HC A02/MF A01 CSCL 20E

The literature contains broad ranges of disagreement in kinetic data for the atomic iodine laser. A kinetic model of a solar-simulator-pumped iodine laser is used to select those kinetic data consistent with recent laser experiments at the Langley Research Center. Analysis of the solar-simulator-pumped laser experiments resulted in the following estimates of rate coefficients: for alkyl radical (n-C3F7) and atomic iodine (I) recombination, 4.3 x 10 to the 11th power (1.9) + or - cu cm/s; for n-C3F7I stabilized atomic iodine recombination (I + I) 3.7 x 10 to the -32nd power (2.3) + or -1 cm to the 6th power/s; and for molecular iodine (I2) quenching, 3.1 x 10 to the -11th power (1.6) + or - 1 cu cm/s. These rates are consistent with the recent measurements. Author

N83-32045# Naval Postgraduate School, Monterey, Calif.
THERMAL COUPLING AND DAMAGE MECHANISMS OF 1.06 MICRON LASER RADIATION AND LASER-PRODUCED PLASMA ON SELECTED MATERIALS M.S. Thesis
William Frost Jenkins and William Richard Schmidt Dec. 1982 126 p refs
(AD-A127608) Avail: NTIS HC A07/MF A01 CSCL 20/5

Thermal coupling and plasma-induced surface damage were investigated for phenomena. A review of thermal coupling and unipolar arcing, along with reference to the physical properties of the target materials involved, provided the basis on wich this study was conducted. Target materials investigated included aluminum and stainless steel, both with polished, unpolished, and Si-coated surface preparations, as well as TiC-coated stainless steel. The experiments were conducted in a .000001 torr, vacuum using a neodymium-glass laser in the Q-switched mode. For uncoated targets a direct correlation exists between thermal coupling and the percent of irradiated surface experiencing breakdown. For coated targets, thermal coupling is dependent on coating thickness and smoothness, Silicon and TiC-coated targets are found to experience unipolar arcing damage. A model is proposed to describe the relationship between arc crater and target properties. GRA

N83-32046# Tennessee Univ., Knoxville. Dept. of Electrical Engineering.
MILLIMETER MICROWAVE EMISSION BY USE OF PLASMA PRODUCED ELECTRONS ORBITING A POSITIVELY-CHARGED WIRE Annual Report, 15 Nov. 1981 - 15 Nov. 1982
Igor Alexeff 15 Nov. 1982 17 p refs
(Grant AF-AFOSR-0045-82; AF Proj. 2301)
(AD-A127240; AFOSR-83-0239TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

Five major advances in the study of the orbitron electrostatic maser have been made during the past 12 month period. These can be tabulated as follows: (1) Reliable pulsed operation at the short wavelength of 2 millimeters; (2) Demonstration of narrow-band pulsed emission at the longer wavelength of about 1 centimeter; (3) Demonstration of continuous emission in a narrow band at the still longer wavelength of about 30 centimeter; (4) Identification of a second mode of maser operation in which the electrons move radially rather than azimuthally; and (5) Success in a computer description of 3 dimensional electron orbits in the electrostatic potential wells. In addition to the five major milestones described above, considerable progress has been made in the experimental, theoretical, and computational study of the device. GRA

N83-32047# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.
F-ATOM DEPLETION IN NF3 COMBUSTOR LASER FLOWS
D. A. Durran, D. J. Spencer, J. M. Herbelin, M. A. Kwok, and W. R. Warren 15 Feb. 1983 21 p refs
(Contract F04701-82-C-0083)
(AD-A127075; SD-TR-83-10; TR-0083(3930-01)-1) Avail: NTIS HC A02/MF A01 CSCL 20/5

Chemical lasers employing NF3 combustors operating at temperatures below 1900 K are subject to F atom depletion because of NFx (x=1,2) radical chemistry. Experiments using arc-heated arc-heating NF3-He mixtures have shown that the F atom flow stagnation temperatures of 1000 to 1600 K is significantly reduced while considerable NF chemiluminescence is observed. A method for obtaining F atom flow from low temperature combustors is described. GRA

N83-32048# Optical Society of America, Washington, D. C.
TOPICAL MEETING ON LASER TECHNIQUES FOR EXTREME ULTRAVIOLET SPECTROSCOPY Final Report, 15 Jan. - 14 Sep. 1982
Jarus W. Quinn Mar. 1982 113 p Meeting held in Boulder, Colo., 8-10 Mar. 1982
(Grant AF-AFOSR-0082-82)
(AD-A127044; AFOSR-83-0247TR) Avail: NTIS HC A06/MF A01 CSCL 20/6

Twenty years ago, great strides were made in high-resolution spectroscopy in the VUV with the building of large grating spectrographs which provided resolving powers on the order of 300,000. Today, with the use of tunable laser sources, resolving powers of approx. 10 to the 7th power have been reached in limited wavelength ranges, with approx. 100,000 available over most of the VUV and XUB spectroscopy will be presented, with emphasis on the resolution achieved to date. These results will be illustrated with recently obtained spectra. GRA

N83-32049# Naval Postgraduate School, Monterey, Calif.
ANALYSIS OF LASER-TURBULENCE UTILIZING A VIDEO TAPE RECORDER AND DIGITAL STORAGE OSCILLOSCOPE M.S. Thesis
John Henry Connor, Jr. Dec. 1982 101 p
(AD-A127859) Avail: NTIS HC A06/MF A01 CSCL 20/5

The ability to measure and predict atmospheric turbulence affecting laser beam propagation is a major concern when considering military applications. Such a method using a telescope, high resolution television camera, video tape recorder, digital storage oscilloscope, and calculator system has been devised, tested and utilized. A laser beam signal is recorded on video tape for further processing. This signal is displayed, stored and digitized using a Tektronix 468 digital storage oscilloscope. The digitized signal is sent to a Hewlett-Packard 9825 computing system for Fourier transform analysis and determination of the refractive index structure constant, C(2,N). Several trials were conducted using He-Ne and Ga-As lasers. The results demonstrated good correlation with theoretical predictions as well as previously analyzed data. Author (GRA)

N83-32050# Naval Research Lab., Washington, D. C. Laser Plasma Branch.
USE OF INDUCED SPATIAL INCOHERENCE FOR UNIFORM ILLUMINATION ON LASER FUSION TARGETS
R. H. Lehmberg and S. P. Obenschain 11 Apr. 1983 13 p refs Sponsored in part by DOE
(AD-A127612; NRL-MR-5029) Avail: NTIS HC A02/MF A01 CSCL 20/5

We report a technique to achieve very uniform illumination of laser irradiated targets by inducing a controlled amount of transverse spatial incoherence in the output beam of a broadband laser. The spatial incoherence is created by imposing different optical delays upon different transverse sections of the beam, and choosing the delay increments to be larger than the laser coherence time tc = 1 delta. This technique may allow easy attainment of the pellet illumination uniformity required for laser fusion. GRA

N83-32051# Cornell Univ., Ithaca, N. Y. Dept. of Chemistry.
ENERGY DISPOSAL IN ELECTRONICALLY EXCITED HALOGENS AND OXYGEN Final Report, 1 Nov. 1981 - 31 Oct. 1982
Paul L. Houston 31 Oct. 1982 8 p refs
(Grant AF-AFOSR-3513-78; AF Proj. 2303)
(AD-A127585; AFOSR-83-0280TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

Collisional quenching of electronically excited iodine atoms by molecular oxygen has been investigated. The primary mechanism of the I(2P1/2) deactivation is shown to be an electronic-to-electronic energy transfer process between the iodine and oxygen, creating electronically excited 02 (1 delta g). In another experiment the total rate of deactivation of 02(1 sigma) by C02 was found to be 5.0 x 10 to the minus 13th power cc3/molecule delta. Electronic-to-vibrational energy transfer from I*(5 2P1/2) to I2 (25 v less than 43) has been observed. Roughly 2% of the I* deactivation result in I2 (v=40) by argon, helium, and I2 at room temperature are (7.3 + or - 0.3) x 100,000 sec -1/torr, (1.0 + or - 0.2) x 1,000,000 6/sec/torr and (1.8 +or- 0.4) x 1,000,000 6/sec -1/torr, respectively. These results in the chemical implications for the mechanism of I2 dissociation in the chemical oxygen/iodine laser. A chain branching mechanism consisting of the steps I* + I2 yield I + I2 yield I + I2 (20 less than v less than 40), I2 (20 less than v less than 40) + O2 (I delta yield 21 + O2, and O2 (1 delta) + I yield O2 + I* may be responsible for the dissociation. GRA

N83-32052# Rome Air Development Center, Griffiss AFB, N.Y. Electromagnetic Sciences Div.
SURFACE ACOUSTIC WAVE NON-LINEAR INTERACTIONS IN LITHIUM NIOBATE Ph.D. Thesis - Missouri Univ.
Roger D. Colvin Jan. 1983 349 p refs
(AF Proj. 4600)
(AD-A127570; RADC-TR-83-9) Avail: NTIS HC A15/MF A01 CSCL 20/5

This report presents investigations of three types on non-linear surface acoustic wave (SAW) interactions in lithium niobate (LiNbO3). In all cases there are two waves interacting. In the first case, convolution, the waves are collinear and counter propagating. In the second case, collinear mixing, the waves are collinear and co-propagating. In the third case, non-collinear mixing, the waves are non-collinear and co-propagating. The theory for these interactions is presented first and is followed by experiments for each of the interactions. The convolver investigations are directed at understanding and quantifying the various losses and improving the efficiency for high frequency (800 MHz) operation. Convolvers were tested as high as 1 GHZ which is the highest frequency of

operation ever reported for a SAW convolver. This establishes the potential for greater than 300 MHz instantaneous bandwidth. As a result the size, weight, and power savings are ten thousand times better than present digital technology. Investigations include propagation loss, diffraction, beam steering, attenuation, multi-moding, output plate resistivity, and output matching. An upper practical limit seems to be 800 MHz. Efficiencies obtained at this frequency were within a few dB of those at 150 MHz.
Author (GRA)

N83-32053# Lincoln Lab., Mass. Inst. of Tech., Lexington. Group 53.
COHERENT LASER RADAR REMOTE SENSING Final Report
David G. Biron, Brian E. Edwards, Stephen Marcus, and Robert J. Hull 18 Dec. 1982 32 p refs
(Contract F19628-80-C-0002; AF Proj. 1900)
(AD-A127717; ESD-TR-82-170) Avail: NTIS HC A03/MF A01 CSCL 20/5

This report summarizes the technical effort accomplished in FY82 on a program to make range-resolved measurements of chemical agents or pollutants distributed within the atmosphere. The rationale for using compact, coherent CO2 laser radar techniques (rather than TEA laser techniques) is discussed. Range-resolved measurements of aerosol backscatter at ranges up to 1.5km are reported. Techniques for making CO2 lasers rapidly tunable among several wavelengths are also described.
Author (GRA)

N83-32054# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ULTRA-STABLE LASER CLOCK M.S. Thesis
Roger Lee Facklam Mar. 1983 137 p refs
(AF Proj. 6095)
(AD-A127519; AFIT/GEP/PH/82D-28) Avail: NTIS HC A07/MF A01 CSCL 14/2

The Air Force has requirement for a high accuracy Helium-Neon Ring Laser Gyro (RLG) and a high accuracy clock. The author has devised a method (patent applied for) whereby a multi-oscillator RLG can be used simultaneously as a gyro and as a clock. The device uses a multi-frequency laser oscillator with an auxiliary detector to sense a 583 MHz beat frequency and necessary electronics to produce a 5 MHz clock signal. The experiment was conducted at the Sudbury, Massachusetts plant of Raytheon Corporation. The square root of the Allan variance was measured for several different sample times. The best data obtained, for the given times, was 4.6 X 10 to the minus 10th power for 1 msec, 3.4 X 10 to the minus 10th power for 10 msec, 8.7 X 10 to the minus 11th power for 0.1 sec, 1.6 X 10 to the minus 10th power for 1 sec, 4.5 X 10 to the minus 10th power for 10 sec, and 4.8 X 10 to the minus 9th power for 100 sec. The data was quantum limited from 1 msec to 200 msec. The long-term degradation was caused by a drift in the Faraday rotator. A method for correcting the Faraday rotator drift is suggested. GRA

N83-32055# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AUTOMATION OF ELECTRIC POWER SYSTEM (SELECTED ARTICLES)
Wubin Lu and Yaozong Zhang 2 Mar. 1983 39 p refs Transl. into ENGLISH from Dianli Xitong Zidonghua (China), no. 4, 25 Jul. 1982 p 39-43, 62-67
(AD-A127839; FTD-ID(RS)T-1752-82) Avail: NTIS HC A03/MF A01 CSCL 09/2

An experiment on the automatic control of laser bias current in a digital system by the total electronic method is described. Approximate expression for junction temperature and threshold current with the consideration of bias current, and makes qualitative and quantitative analyses on the nonideal saturation characteristic for the junction voltage, which is the theoretical basis of the total electronic method for automatic control of bias current is also presented. GRA

N83-32056# RCA Labs., Princeton, N. J.
OPTIMIZED COUPLERS BETWEEN JUNCTION LASERS AND SINGLE-MODE FIBERS Final Report, 31 Aug. 1981 - 31 Jan. 1983
J. M. Hammer and C. C. Neil Mar. 1983 41 p refs
(Contract N00014-81-C-2522; XF62583005)
(AD-A128040; AD-E001425; RCA-PRRL-83-CCR-4) Avail: NTIS HC A03/MF A01 CSCL 20/5

Single mode fiber output power of over 7.5 mW CW has been obtained by the use of unique adjustable coupling modules that were developed for this program and that are being delivered to NRL. These are the highest powers ever reported coupled between diode lasers and single mode fibers. Coupling efficiencies over 25% were obtained in simple butt coupling by taking advantage of the large mode size available from RCA CDH LOC lasers. We also observed peak fiber power of over 9 mW with 100 ns 50% duty cycle pulses. The miniature models provide relative transverse and lateral motion between fiber and laser with 2000A resolution, allowing fine tuning against long term drifts. The coupling, while adjustable, is still stable against moderate acceleration of module and motion of fiber pigtail. The adjustments may be adapted to servo control. Still higher coupling efficiencies might be expected with cylinder lenses bonded to the fiber. Initial experiments indicated the need for further work to achieve accurate and stable attachment of lens to fiber. GRA

N83-32057# Ballistic Research Labs., Aberdeen Proving Ground, Md.
A MODIFICATION TO A FLASHLAMP-PUMPED DYE LASER TO INCREASE STABILITY OF THE SPATIAL MODE Final Report
Mark A. DeWilde and Leon J. Decker May 1983 13 p ref
(DA Proj. 1L1-61102-AH043)
(AD-A128037; AD-F300241; ARBRL-MR-03265) Avail: NTIS HC A02/MF A01 CSCL 20/5

It was determined by Fitzpatrick and Piepmeier that the spatial mode structure of the beam from a CMX-4 dye laser (Chromatix, Sunnyvale, CA) could be stabilized by maintaining a precise relationship between dye loop and cooling water loop temperatures. A passive modification to the laser is described that eliminates the active heating and cooling mechanisms that were employed by the initial investigators to accomplish this. GRA

N83-32058# California Univ., San Diego, La Jolla. Dept. of Chemistry.
HIGH EFFICIENCY PICOSECOND PULSE GENERATION IN THE 675-930 NM REGION FROM A DYE LASER SYNCHRONOUSLY PUMPED BY AN ARGON-ION LASER
Philippe Bado, Charles Dupuy, Kent R. Wilson, Richard Boggy, John Bowen, and Sicco Westra Apr. 1983 11 p refs Submitted for publication Prepared in cooperation with Spectra-Physics, Inc., Mountain View, Calif. Sponsored in part by NSF and the Swiss National Foundation
(Contract N00014-78-C-0325)
(AD-A128033; TR-13) Avail: NTIS HC A02/MF A01 CSCL 20/5

Picosecond pulses tunable from 675 to 930 micrometers have been obtained from a dye-laser synchronously pumped at 514.5 micrometers by a mode-locked Argon-ion laser. Peak energy conversion efficiencies between 10% and 29% are observed with pulse durations between 1.7 ps and 16 ps as measured by autocorrelation. Author (GRA)

N83-32059# Rochester Univ., N. Y. Dept. of Chemistry.
THEORY OF COLLISION-INDUCED IONIZATION OF ADSORBED SPECIES ON SOLID SURFACES IN THE PRESENCE OF LASER RADIATION
Kai-Shue Lam and Thomas F. George May 1983 36 p refs
(Contract N00014-80-C-0472)
(AD-A128317; UROCHESTER/DC/83/TR-33) Avail: NTIS HC A03/MF A01 CSCL 20/5

A formalism is proposed for treating the problem of ionization of adsorbed species on solid surfaces. The ionizing agents are taken to be impact atoms and laser radiation with frequency low

compared to the inverse of characteristic collision times. The physical constraints of short collision times and low laser frequency then allow one to treat the adatom-surface-plus-field system under the quasi-static approximation (QSA) and the impact-atom-adatom-surface collision dynamics under the impulse approximation (IMA). The latter leads to a time-dependent ionization cross-section which is factorizable into the square of an electron-atom scattering matrix element and a spectral function describing the energy-momentum distribution of electrons in the adatom-surface-plus-field system. The formalism focuses on the spectral function which is shown to be derivable from a single particle Green's function exactly calculable for the present problem. Author (GRA)

N83-32060# Naval Research Lab., Washington, D. C.
LASER-PLASMA INTERACTION EXPERIMENTS AND DIAGNOSTICS AT NRL (NAVAL RESEARCH LABORATORY)
B. H. Ripin, J. Grun, M. J. Herbst, S. T. Kacenjar, and E. A. McLean 11 May 1983 31 p refs Presented at the 6th Intern. Workshop on Laser Interactions and Related Plasma Phenomena, Monterey, Calif., 25-29 Oct. 1982
(AD-A128254; NRL-MR-5078) Avail: NTIS HC A03/MF A01 CSCL 20/9

Laser plasma interaction experiments have now advanced to the point where very quantitative measurements are required to elucidate the physic issues important for laser fusion and other applications. Detailed time-resolved knowledge of the plasma density, temperature, velocity gradients, spatial structure, heat flow characteristics, radiation emission, etc, are needed over tremendou ranges of plasma density and temperature. Moreover, the time scales are very short, aggrevating the difficulty of the measurements further. Nonetheless, such substantial progress has been made in diagnostic development during the past few years that we are now able to do well diagnosed experiments. In this paper the authors review recent diagnostic developments for laser-plasma interactions, outline their regimes of applicability, and show examples of their utility. In addition to diagnostics for the high densities and temperature characteristic of laser fusion physics studies, diagnostics designed to study the two-stream interactions of laser created plasma flowing through an ambient low density plasma will be described. GRA

N83-32061# Mathematical Sciences Northwest, Inc., Bellevue, Wash.
RESEARCH PROGRESS AND FORECAST REPORT FOR MSNW FEL OSCILLATOR PROGRAM Annual Report, 15 Jun. 1981 - 14 Aug. 1982
J. Slater, D. C. Quimby, and W. Grossman Jan. 1983 63 p refs (Contracts F49620-81-C-0079; N00014-80-C-0443; AF Proj. 2301)
(AD-A127786; AFOSR-83-0346TR; MSNW-C.11.198.01) Avail: NTIS HC A04/MF A01 CSCL 20/5

The purpose of this program is to provide assessment data for determining the potential of tapered-wiggler free-electron laser (FEL) oscillators. It is expected that the tapered-wiggler concept will lead to the development of high-efficiency FELs by providing substantial energy extraction in a single pass of the e-beam through the wiggler magnet. The work consists of parallel theory and experimental tasks. The latter involve parameterization of the FEL interaction on a single pass basis, and this portion of the work has not yet been completed. The theory work described here deals with the transverse mode structure of FEL oscillators. This mode analysis has shown that (1) the one-way nature of the FEL gain media results in an asymmetric mode which is not an eigenmode of the cavity, i.e., it is described as a linear combination of cavity modes, (2) the higher-order mode content is largest in confocal or concentric cavities, rather than the intermediate cases, (3) the higher-order mode content can be controlled by aperturing, and (4) the quality of the output beam is nearly diffraction limited. Author (GRA)

N83-32062# Illinois Univ., Urbana. Dept. of Electrical Engineering.
ALKALI-RARE GAS AND METAL-HALIDE MOLECULES AS POTENTIAL TUNABLE AND EFFICIENT LASERS IN THE VIS-IBLE Final Report, 1 Oct. 1981 - 30 Sep. 1982
J. G. Eden Nov. 1982 25 p refs
(Grant AF-AFOSR-0138-79; AF Proj. 2301)
(AD-A128534; AFOSR-83-0429TR; UILU-ENG-82-2554) Avail: NTIS HC A02/MF A01 CSCL 20/5

Experiments involving metal-halide dissociation lasers are described. A UV-preionized, discharge-pumped CdI (cadmium iodide) laser has been demonstrated at 657 nanometers. In addition, iron (Fe) and lithium (Li) photodissociation lasers have been demonstrated. Author (GRA)

N83-32063# Tennessee Univ., Tullahoma. Space Inst.
MIE SCATTERING THEORY FOR PARTICLE SIZING INTERFEROMETRY WITH THE DUAL BEAM LASER VELOCIMETER Ph.D. Thesis
J. D. Pendleton Feb. 1983 164 p refs
(Contract DE-AC02-79ET-10815)
(DE83-009249; DOE/ET-10815/58) Avail: NTIS HC A08/MF A01

An analytical solution for the light scattered by a sphere located in the cross over region of two laser beams is developed to allow computation of the visibility parameter for in situ particle sizing. The solution provides for evaluation of the visibility particle sizing concept for application to high temperature coal-fired magnetohydrodynamic electrical power generation. The solution is very general since it is applicable to laser beams with any desired wavelength, propagation directions and polarization orientations and to light collecting apertures of any size and location. Therefore, the solution provides for comparative selection of optical configurations for optimal implementation of the visibility particle sizing technique in the severe environment of coal-fired magnetohydrodynamics. The visibility solution is developed from a detailed solution of the Mie theory scattering problem obtained by using the vector multipole field method. DOE

N83-32064# Brookhaven National Lab., Upton, N. Y. National Synchrotron Light Source.
THE BROOKHAVEN FREE-ELECTRON LASER EXPERIMENT
S. Krinsky, A. Luccio, C. Pellegrini, A. vanSteenbergen, and L. H. Yu 1982 3 p Presented at the Free Electron Laser Conf., Bendor, France, 26 Sep. - 1 Oct. 1982
(DE83-002840; BNL-32087; CONF-820988-3) Avail: NTIS HC A02/MF A01

The status of the free-electron laser experiment is reported. The permanent undulator already built and ready to be installed on the VUV storage ring is described. DOE

N83-32065# Stanford Linear Accelerator Center, Calif.
USE OF NITROGEN LASER FOR OBSERVATION OF SPACE-CHARGE EFFECTS IN DRIFT CHAMBERS
J. Vavra Oct. 1982 4 p refs Presented at the IEEE Nucl. Sci. Symp., Washington, D.C., 20 Oct 1982
(Contract DE-AC03-76SF-00515)
(DE83-004416; SU-SLAC-PUB-2984; CONF-821011-33) Avail: NTIS HC A02/MF A01

A two stage nitrogen laser was built and is presently being used to investigate properties of drift chambers. The measured parameters of this laser, the results of a study of the double track separation in a drift chamber of jet design and a measurement of the saturation effects in this chamber as a function of total gain were presented. An understanding of the saturation effects is important for drift chambers with multiple hit capability. The laser technique reported here represents a major improvement in the simplicity of investigation of the double track separation and saturation effects. DOE

N83-32066# National Inst. for Occupational Safety and Health, Cincinnati, Ohio.
LASER APPLICATIONS PRESENT AND FUTURE: PROSPECTS FOR SIGNIFICANT OCCUPATIONAL SAFETY AND HEALTH IMPACT
Jerome P. Smith Jun. 1982 9 p
(PB83-184507) Avail: NTIS HC A02/MF A01 CSCL 06J

Applications of lasers are growing in a number of areas; some applications are relatively widespread with developed industrial laser processes while others are considered purely research and development applications with little industrial use at the present time. In this brief writeup an attempt will be made to examine present and future areas of laser use and assess how they may impact on occupational safety and health in either a positive or negative way. GRA

N83-32497# Kyoto Univ. (Japan). Dept. of Aeronautical Engineering.
DENSITY MEASUREMENTS OF A FREE JET BY A LASER DIFFERENTIAL INTERFEROMETER
Michio Nishida and Akihiko Nakajima *In* Inst. of Space and Astronautical Sci. *Proc. of the Symp. on Mech. for Space Flight* Mar. 1983 p 169-177 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N83-32067* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LINEAR MAGNETIC BEARING Patent
Philip A. Studer, inventor (to NASA) Issued 14 Jun. 1983 15 p Filed 8 Dec. 1980 Supersedes N81-22279 (19 - 13, p 1752)
(NASA-Case-GSC-12517-1; US-Patent-4,387,935; US-Patent-Appl-SN-214361; US-Patent-Class-308-10; US-Patent-Class-104-282; US-Patent-Class-104-290; US-Patent-Class-310-12) Avail: US Patent and Trademark Office CSCL 13I

A linear magnetic bearing system having electromagnetic vernier flux paths in shunt relation with permanent magnets, so that the vernier flux does not traverse the permanent magnet, is described. Novelty is believed to reside in providing a linear magnetic bearing having electromagnetic flux paths that bypass high reluctance permanent magnets. Particular novelty is believed to reside in providing a linear magnetic bearing with a pair of axially spaced elements having electromagnets for establishing vernier x and y axis control. The magnetic bearing system has possible use in connection with a long life reciprocating cryogenic refrigerator that may be used on the space shuttle. J.D.H.

N83-32068# Monsanto Research Corp., Miamisburg, Ohio.
CHEMISTRY OF GLASS-CERAMIC/METAL BONDING FOR HEADER APPLICATIONS. 1: EFFECT OF TREATMENTS ON INCONEL 718 AND HASTELLOY C-276 METALLIC SURFACES
W. E. Moddeman, D. P. Kramer, S. M. Craven, and R. E. Schneider 1982 4 p refs Presented at Conf. on Glass and Ceramic Mater., Oak Ridge, Tenn., 8 Nov. 1982
(Contract DE-AC04-76DP-00053)
(DE83-003367; MLM-3032(OP); CONF-821122-6) Avail: NTIS HC A02/MF A01

Glass-ceramic headers usually consist of a high tensile strength shell, one or several metal rings and/or pins which act as electrical feedthroughs, and a glass-ceramic to metal seals were fabricated using a lithia-alumina-silica glass and either Inconel 718 or Hastelloy C-276 as the metal piece parts. Auger electron spectroscopy was employed to study the change in surface chemistry on metal surfaces caused by the different manufacturing processes. DOE

N83-32069*# Battelle Columbus Labs., Ohio.
EVALUATION OF OUTER RACE TILT AND LUBRICATION ON BALL WEAR AND SSME BEARING LIFE REDUCTIONS Final Report
J. W. Kannel, T. L. Merriman, R. D. Stockwell, and K. F. Dufrane 7 Jul. 1983 35 p refs
(Contract NAS8-34908)
(NASA-CR-170836; NAS 1.26:170836) Avail: NTIS HC A03/MF A01 CSCL 13I

Several aspects of the SSME bearing operation were evaluated. The possibility of elastohyrodynamics (EHD) lubrication with a cryogenic fluid was analyzed. Films as thick as .61 microns were predicted with one theory which may be thick enough to provide hydrodynamic support. The film formation, however, is heavily dependent on good surface finish and a low bulk bearing temperature. Bearing dynamics to determine if the radial stiffness of a bearing which are dependent on bearing misalignment were analyzed. Four ball tests were conducted at several environmental conditions from an LN2 bath to 426 C in air. Surface coatings and ball materials are evaluated. Severe wear and high friction are measured for all ball materials except when the balls have surface lubricant coatings. E.A.K.

N83-32070*# Rockwell International Corp., Canoga Park, Calif. Rocketdyne Div.
HIGH SPEED CRYOGENIC SELF-ACTING, SHAFT SEALS FOR *LIQUID ROCKET TURBOPUMPS Final Report, Jun. 1972 - Sep. 1983*
R. E. Burcham Jun. 1983 287 p refs
(Contract NAS3-20807)
(NASA-CR-168194; NAS 1.26:168194; RI-RD83-163) Avail: NTIS HC A13/MF A01 CSCL 11A

Three self acting lift pad liquid oxygen face seals and two self acting gaseous helium circumferential seals for high speed liquid oxygen turbopump were evaluated. The development of a technology for reliable, 10 hour life, multiple start seals for use in high speed liquid oxygen turbopumps is discussed. E.A.K.

N83-32071# National Aeronautical Establishment, Ottawa (Ontario). Structures and Materials Lab.
AN SEM ANALYSIS OF BEARING FAILURE DUE TO ELECTRICAL ARCING
W. Wiebe and D. D. Morphy Jan. 1983 16 p ref In ENGLISH; FRENCH summary
(AD-A127827; NRC-20936; NAE-AN-3) Avail: NTIS HC A02/MF A01 CSCL 13/9

Failure of a cam clutch after some 2,000 hours of operation was found to be due to bearing failure. When examined in the scanning electron microscope, evidence of molten metal in the form of craters or pools, and of minute globules of metal was found on the balls and races of the bearings. This suggested that electrical arcing between the balls and the races had occurred, and this was considered to be the primary cause of subsequent fatigue and other mechanical damage to these components.
Author (GRA)

N83-32072# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Materials Science and Mineral Engineering.
DEVELOPMENT OF FERRITIC WELDMENTS FOR GRAIN-REFINED FERRITIC STEELS FOR 4.2K SERVICE Ph.D. Thesis
Hee Jin Kim Nov. 1982 135 p refs
(Contract DE-AC03-76SF-00098)
(DE83-009059; LBL-14748) Avail: NTIS HC A07/MF A01

The weldability of grain-refined ferritic nickel steels designed for structural use in liquid helium was investigated. Plates of interstitial-free Fe-12Ni-0.25Ti alloy and carbon-containing 9Ni steel were welded with 14Ni ferritic fillers using a gas tungsten arc welding (GTAW) process with pure argon gas shielding. The ferritic weldments made have a strength closely matching those of the base plates. The comparable toughness is attributed to three factors: the defect-free weldment, the chemical cleanliness of the GTAW weld deposit, and the in-process formation of an appropriate microstructure in the welded region. Changes in microstructures with respect to the characteristic of the weld thermal cycles and the effect of the resultant microstructures on low temperature toughness were studied. In the heat-affected zone (HAZ) of multipass welded 9Ni steel, the retained (or precipitated) austenite is removed by the weld heat cycles but the tempering cycles associated with weld passes re-establish high toughness by sequentially refining the grain size and gettering carbon on the form of cementite precipitates. The high toughness in the HAZ of

the 12Ni alloy and in the weld deposit is a direct consequence of repeated grain refinement through the overlapped austenitizing cycles and is not affected by the tempering cycles because of the carbon-free nature of these materials. DOE

N83-32073# California Univ., Berkeley. Lawrence Berkeley Lab.
EMISSION CHARACTERISTICS OF A MEDIUM-SPEED DIESEL USING WATER-EMULSIFIED RESIDUAL FLUIDS
D. D. Brehob, F. Roberts, R. F. Sawyer, and K. R. Pearce Oct. 1982 24 p refs Presented at Combust. Inst. Symp. on Western States Sect., Livermore, Calif., 11 Oct. 1982
(Contract DE-AC03-76SF-00098)
(DE83-001552; LBL-14987; CONF-821035-5) Avail: NTIS HC A02/MF A01

Particulate and NO/sub x/ concentrations and thermal efficiency were measured on a medium speed, 2500 kW (3400-hp) diesel engine using diesel No. 2 reference fuel and three high viscosity residual fuels. The fuels were emulsified at 0% to 12% water addition with droplet diameters of 2 to 5, 5 to 10, and 10 to 20 micrometers. No effects were detected from different ranges of droplet diameter. Both NO/sub x/ concentration and thermal efficiency decreased as water level was increased: about 10% to 15% for NO/sub x/ and less than 2% for thermal efficiency (at 12% water). The engine emits about 0.051 gm/MJ (0.14 gm/bhp-hr) particulate for diesel No. 2 and about 0.25 gm/MJ (0.65 gm/bhp-hr) for both the 3500 and 5000 Seconds Redwood International (SRI) viscosity residual fuels. Particulate formation with 12% water addition was higher than with 4% water addition or dry residual fuels. X-ray fluorescence analysis determined that the particulate matter contained about 9% ash when using diesel No.2 and 30% ash when using the residual fuels. GRA

N83-32074# Klein, Schanzin und Becker A.G., Frankenthal (West Germany).
DEVELOPMENT AND TESTING OF A SUBMERSIBLE MOTOR PUMP DRIVEN BY A SOLAR CELL GENERATOR Final Report, Dec. 1981
Ernst Pichmaus and Volker Fleckenstein (Siemens AG, Munich) Bonn Bundesministerium fuer Forschung und Technologie May 1983 35 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-081; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7,50

A submersible motor pump driven by a solar cell is described. The pump and motor efficiency of a submersible motor pump of series standard was improved by 10 points using an asynchronous motor similar to series. To convert the DC current delivered by solar cells into ac current of variable frequency and voltage, a pulse converter with MOS power transistors and a control device were developed. The unit consists of an on-off automatic device and a maximum power point control device. For testing the single components and the total system, a test appliance was installed. A total efficiency of 43% at nominal load and of 33% at 1/4 load is obtained. Author (ESA)

N83-32075# Nippon Kokan Co. Ltd., Tokyo (Japan).
RESEARCH ON HOT CRACKING IN WELD METAL BY MELTING-SOLIDIFICATION HEAT CYCLE SIMULATOR
Hiroyuki Honma, Naomichi Mori, and Shoji Saito [1983] 46 p refs Transl. into ENGLISH of Seitetsu Kerkyu (Japan), no. 307, 1982 46 p
(PB83-178921) Avail: NTIS HC A03/MF A01 CSCL 13H

The high temperature strength and ductility of various solidified metals were investigated by using a melting solidification heat cycle simulator which makes the band melting principle. The relationship between those properties and the welding hot cracking sensitivity of the metals is discussed. GRA

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N83-32076# British Library Lending Div., Boston Spa (England).
EXPERIENCE WITH NON-DESTRUCTIVE TESTING OF ROLLED PRODUCT QUALITY AT THE ORSK KHALILOVO WORKS
G. N. Mulko, G. V. Grigoryan, V. G. Poluboyarinova, and A. I. Bodyakov 1983 9 p refs Transl. into ENGLISH from Stal (USSR), no. 6, 1982 p 76-78
(BLL-M-34974-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Types of nondestructive testing equipment are reviewed. The layouts of various ultrasonic testing installations are briefly described and the types of products for which they are used are tabulated against the relevant quality standards. Author

N83-32077# Air Force Systems Command, Wright-Patterson AFB, Ohio.
NONDESTRUCTIVE INSPECTION AND MEASUREMENT
Wu Zhun 7 Mar. 1983 10 p refs Transl. into ENGLISH from Hangtian (China), no. 5 p 4-5
(AD-A127971; FTD-ID(RS)T-0074-83) Avail: NTIS HC A02/MF A01 CSCL 14/2

Nondestructive inspection methods used on rockets, which are a collection of nondestructive inspection techniques were examined. It is suggested that the technique is necessary for higher product reliability and quality in the space industry. The technique is developing toward automation, miniaturization, and quantization. GRA

N83-32078# Dayton Univ., Ohio. School of Engineering.
RELATIONSHIP BETWEEN MANUFACTURING YIELDS AND FIELD FAILURE RATES OF ELECTRONIC EQUIPMENT Final Report, 30 Sep. - 30 Nov. 1982
Eugene E. Jones and John M. Pearson 1 Feb. 1983 86 p
(Contract F33615-82-R-5097)
(AD-A128498; UDR-TR-82-154) Avail: NTIS HC A05/MF A01 CSCL 09/5

This research seeks to determine the degree of correlation between manufacturing yields and field failure rates (operational reliability) of electronic equipment. A designated set of line replaceable units (LRUs) within the avionic subsystems of the A-10A; F-4C/D/E; F-15C and F-16A/B is selected as pilot items in this study, with prime emphasis on the reliability of the printed circuit boards (PCBs) within these units. In Phase I, the data base needed to measure this correlation is established. In Phase 2, correlations among these data will be sought. Based on the significance of these correlations, recommendations will be formulated in Phase 3 to use these research results in Production Readiness Reviews (PRRs) and Risk Assessments for future acquisitions of electronic equipment. Author (GRA)

N83-32079# Pittsburgh Univ., Pa. Dept. of Industrial Engineering.
COMPARISON OF ALGORITHMS FOR COMPUTING GENERATING-SYSTEM RELIABILITY INDEXES Final Report
M. Mazumdar Feb. 1983 126 p refs Sponsored by EPRI
(EPRI Proj. TPS81-822)
(DE83-901863; EPRI-EL-2874) Avail: NTIS HC A07/MF A01

This report describes the results of a research project to compare the accuracy of several algorithms for computing generating-system reliability indices. The principal index considered in this report is the loss-of-load probability (LOLP) measure. The approximate procedures considered are: (1) the method of cumulants, (2) distribution fitting method, (3) large-deviation procedure, and (4) Monte Carlo Importance Sampling procedure. Preliminary results are given to indicate the application of the large-deviation procedure in production costing computations. The approximate procedures are broadly reviewed from the viewpoint

of statistical theory and their possible application in generation-reliability computations. By applying these procedures to computing the reliability indices for several representative utility systems, it is observed that the large-deviation method is generally very accurate. A set of recommended procedures to be used by the industry is given, and directions for further research are outlined. DOE

N83-32080# Los Alamos Scientific Lab., N. Mex. Theoretical Div.
SCATTERING BY FLAWS IN A SLAB OR A HALF-SPACE
William M. Visscher 1982 19 p refs Presented at the Rev. of Progr. in Quantitative NDE, San Diego, Calif., 1-6 Aug. 1982 (Contract W-7405-eng-36)
(DE83-000637; LA-UR-82-2703; CONF-820820-6) Avail: NTIS HC A02/MF A01

It is the main function of quantitative NDE to detect and to evaluate defects. Some of the most dangerous defects are cracks, especially cracks on or near surfaces. These cracks can be found by scattering ultrasonic waves from them, but up to now there is no theory (at least in the most interesting low-to-intermediate frequency region) which has been implemented to compute scattering from surface or near-surface cracks in 3d. The principles of a general boundary-integral-representation method which was used to calculate scattering of waves of all polarizations by a 2d surface or subsurface crack is explained. The method is developed for bulk defects and cracks in a slab as well as in a half space, and is straight forward applicable to 3 dimensional problems as well as to 2d ones. DOE

N83-32651# Joint Publications Research Service, Arlington, Va.
NONDESTRUCTIVE QUALITY CONTROL DISCUSSED
M. Mikheyev *In its* USSR Rept.: Sci. and Technol. Policy No. 9 (JPRS-82713) 24 Jan. 1983 p 31-33 Transl. into ENGLISH from Pravda (USSR), 22 Aug. 1982 p 3 (For primary document see N83-32647 20-81)
Avail: NTIS HC A05

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N83-32081* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FIXTURE FOR ENVIRONMENTAL EXPOSURE OF STRUCTURAL MATERIALS UNDER COMPRESSION LOAD Patent
Ronald K. Clark and W. Barry Lisagor, inventors (to NASA) Issued 19 Jul. 1983 4 p Filed 26 Nov. 1980 Supersedes N81-19429 (19 - 10, p 1350)
(NASA-Case-LAR-12602-1; US-Patent-4,393,716; US-Patent-Appl-SN-210506; US-Patent-Class-73-818; US-Patent-Class-73-822; US-Patent-Class-73-856; US-Patent-Class-73-860; US-Patent-Class-374-51) Avail: US Patent and Trademark Office CSCL 20K

A device for stressing a deformable material specimen consists of top plate and a bottom plate sandwiching a guide cylinder. The specimen is positioned on the bottom plate and attached to a load piston. Force is applied through the top plate into the guide cylinder. Once the specimen is loaded, the stress is maintained by tightening tie bolt nuts.

Official Gazette of the U.S. Patent and Trademark Office

N83-32082# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 15, NO. 4 Monthly Report
Judith Nagle-Eshleman, ed. Apr. 1983 88 p refs
(AD-A128158) Avail: SVIC, Naval Research Lab., Code 5804, Washington, D.C. 20375 CSCL 20/11

Vibration analysis of piston engines with applications to noise control, and dynamic applications of piezoelectric crystals are addressed. For individual titles, see N83-32083 through N83-32084.

N83-32083# University of Technology, Leicester (England). Dept. of Transport Technology.
VIBRATION ANALYSIS OF PISTON ENGINES WITH APPLICATION TO NOISE CONTROL
M. G. Milsted *In* Shock and Vibration Information Center The Shock and Vibration Digest, v. 14, no. 4 Apr. 1983 p 3-14 refs (For primary document see N83-32082 20-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

Literature from 1958 to early 1982 concerned with high frequencies vibration and noise from piston engines is surveyed. Problems associated with characterization of the vibration source, its transmission through the engine structure and the coupling between surface vibration and radiated noise are included. Author

N83-32084# Technical Univ. of Istanbul (Turkey).
DYNAMIC APPLICATIONS OF PIEZOELECTRIC CRYSTALS. PART 2: THEORETICAL STUDIES **c76**
M. C. Doekmeci *In* Shock and Vibration Information Center The Shock and Vibration Digest, v. 14, no. 4 Apr. 1983 p 15-26 refs (For primary document see N83-32082 20-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/2

The dynamic applications of piezoelectric crystals are reviewed. Waves and vibrations in piezoelectric one dimensional and two dimensional structural elements are covered. New trends of research are pointed out for future applications of piezoelectric crystals. Author

N83-32085# British Library Lending Div., Boston Spa (England).
BENDING MOMENTS IN OXIDES ON THE SURFACE OF PARTICLES OF DISPERSED IRON
V. I. Bodnarchuk, D. I. Ryzhonkov, L. A. Pronin, and V. N. Oguenko 17 May 1983 8 p refs Transl. into ENGLISH from Iz. 77-81 (BLL-M-34936-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

A theoretical treatment is given of the formation of bending moments in oxide layers on iron particles obtained by the air or water atomizing of liquid iron. It is shown that the moments can cause detachment of the oxide layer from the particle. The maximum size of the oxide plates detached is calculated, together with the diameter of the contact spot between the oxide layer and the particle core. The study was supported by optical and scanning-electron microscope observations on water atomized particles. Author

N83-32086# British Library Lending Div., Boston Spa (England).
DETERMINATION OF STRESS-CONCENTRATION FACTOR BY THE CAUSTIC CURVES METHOD
V. A. Morozov, L. A. Radugina, and N. A. Chelyshev 24 May 1983 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Metall. (USSR), no. 6, 1982 p 71-76
(BLL-M-34987-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

In spite of the need for corrective calculations and in spite of the exacting requirements imposed on the optical properties of the surface to be examined, the caustic curves method is shown to be the simplest and most effective means of determining stress concentration coefficients in problems of fracture mechanics. Author

N83-32087# British Library Lending Div., Boston Spa (England).
EXPERIMENTAL DETERMINATION OF INTER-LAP PRESSURE IN COILS OF STEEL STRIP
P. P. Chernov, V. I. Meleshko, V. L. Mazur, and V. I. Vinogradov 1983 5 p refs Transl. into ENGLISH from Stal (USSR), no. 7, 1982 p 46-47
(BLL-M-35006-(5828.4)) Avail: British Library Lending Div., Boston

Spa, Engl.

A method is devised for experimentally determining and controlling the variation in inter-lap pressure during the coiling of cold-rolled strip. Tests proved the pressure gauge (elastic element with strain gauges in the window of a "false-lap") to be reliable and capable of good reproducibility. The resultant improvement in coiling stability and the surface quality of the strip is economically advantageous. Author

N83-32088# British Library Lending Div., Boston Spa (England).
RATE AND MAGNITUDE OF DEFORMATION DURING CUTTING OF PLATE MATERIALS
V. I. Ber and D. I. Suyarov 1983 6 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 6, 1982 p 51-55
(BLL-M-34983-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Modelling of the three stages of plastic deformation of plate materials during cutting was carried out by means of rigid blocks, enabling formulae to be derived for determining the rate and magnitude of deformation. The resistance of metal to deformation can be calculated using these formulae. Author

N83-32089# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 15, NO. 3 Monthly Report
Judith Nagle-Eshleman, ed. Mar. 1983 100 p refs
(AD-A126991) Avail: SVIC, Naval Research Lab., Code 5804, Washington, D.C. 20375 CSCL 20/11

Methods of digital synthesis (simulation) of earthquake records that are compatible with a target (specified) response-design spectrum are reviewed. The target spectrum can be specified either deterministically or stochastically. Some aspects of this problem that could receive additional attention are presented. The usefulness of a target spectrum-based approach to the design of earthquake resistant structures is addressed. For individual titles, see N83-32090 through N83-32092.

N83-32090# University of Technology, Leicester (England). Dept. of Transport Technology.
FINITE DIFFERENCE METHODS IN VIBRATION ANALYSIS
B. Ali *In* Shock and Vibration Information Center The Shock and Vibration Digest, V. 15, No. 3 Mar. 1983 p 3-8 refs (For primary document see N83-32089 20-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

Literature concerned with the application of the finite difference technique to the analysis of natural vibration of engineering components is reviewed. The review covers the period from 1978 to 1982 and concentrates on the analysis of beams, plates, and shells. A brief introduction to the finite difference technique is included. Author

N83-32091# Technical Univ. of Istanbul (Turkey).
DYNAMIC APPLICATIONS OF PIEZOELECTRIC CRYSTALS. PART 1: FUNDAMENTALS
M. C. Doekmeci *In* Shock and Vibration Information Center The Shock and Vibration Digest, V. 15, No. 3 Mar. 1983 p 9-20 refs (For primary document see N83-32089 20-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

The dynamic applications of piezoelectric crystals are reviewed. Waves and vibrations in piezoelectric one dimensional and two dimensional structural elements are covered. New trends of research are pointed out for future applications of piezoelectric crystals. Author

N83-32092# Texas Univ., Austin. Dept. of Engineering Mechanics.
DIGITAL SYNTHESIS OF RESPONSE-DESIGN SPECTRUM COMPATIBLE EARTHQUAKE RECORDS FOR DYNAMIC ANALYSES **c46**
P. T. D. Spanos *In* Shock and Vibration Information Center The Shock and Vibration Digest, V. 15, No. 3 Mar. 1983 p 21-30 refs (For primary document see N83-32089 20-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 08/11

Finite difference methods in vibration analysis, dynamic applications of piezoelectric crystals, and digital synthesis of response design spectrum compatible earthquake records for dynamic analysis are addressed. Author

N83-32093 National Physical Lab., Teddington (England). Div. of Information Technology and Computing.
NON-LINEAR DATA FITTING FOR ANALYSIS OF FRICTION STRESS AND RECOVERY IN METAL ALLOYS
Helen M. Jones Oct. 1982 22 p refs
(NPL-DITC-13/82; ISSN-0262-5369) Copyright. Avail: Issuing Activity

Transient creep in metal alloys following stress reduction was analyzed. After imposing an initial stress, the incubation times before creep occurs, as the stress is reduced, are measured. The mathematical model includes a constant related to a kinetic factor describing recovery (A), and the friction or back-stress (B). The data fitting problem is formulated in terms of a nonlinear least squares optimization problem. It is shown that the parameter A can be expressed in terms of B. The resulting univariate problem is solved using safeguarded successive cubic interpolation. A statistical analysis of the solution pair A and B is used to assess their reliability in the presence of error. The computer program used and examples are included. Author (ESA)

N83-32094 National Physical Lab., Teddington (England). Div. of Mechanical and Optical Metrology.
RECOMMENDED PROCEDURE FOR MICRO-INDENTATION VICKERS HARDNESS TEST
G. N. Peggs and I. C. Leigh Mar. 1983 16 p refs
(NPL-MOM-62; ISSN-0309-3069) Copyright. Avail: Issuing Activity

A procedure for the Vickers hardness test for cases where the diagonal length of the indentation is in the range 20 to 100 microns, and the load applied to the identer is < 1 kgf is outlined. Apparatus, factors which affect accuracy, measuring procedure, the use of certified test blocks, and presentation of results are covered. Author (ESA)

N83-32095*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STRUCTURES AND DYNAMICS DIVISION: RESEARCH AND TECHNOLOGY PLANS FOR FY 1983 AND ACCOMPLISHMENTS FOR FY 1982
Kay S. Bales Jun. 1983 112 p refs
(NASA-TM-85661; NAS 1.15:85661) Avail: NTIS HC A06/MF A01 CSCL 20K

The objectives, expected results, approach, and milestones for research projects of the IPAD Project Office and the impact dynamics, structural mechanics, and structural dynamics branches of the Structures and Dynamics Division are presented. Research facilities are described. Topics covered include computer aided design; general aviation/transport crash dynamics; aircraft ground performance; composite structures; failure analysis, space vehicle dynamics; and large space structures. A.R.H.

N83-32096# Maryland Univ., College Park.
ADAPTIVE FINITE ELEMENT PROCESSES IN STRUCTURAL MECHANICS
Ivo Babuska and Werner C. Rheinboldt 1983 33 p refs Prepared in cooperation with Pittsburgh Univ.
(Contracts N00014-77-C-0623; N00014-80-C-0455; Grant NSF MCS-78-05299)
(AD-A127010; ICMA-83-52) Avail: NTIS HC A03/MF A01 CSCL 13/13

For a general assessment of the structure, qualitative results about the displacements, stress-distributions, etc. are needed with an engineering accuracy of, say 10-20%. On the other hand, the

indicated decisions are based usually on relatively few data items with a higher accuracy, say, in the range of 2-5%, such as, the displacements or stresses in certain known critical points, stress-intensity factors, etc. To achieve these diverse objectives the computational procedures should include the following features: (1) Facilities for effective and reliable estimation of the errors of the computed results; (2) Adaptively controlled computations; (3) Post-processing facilities. Certain specific questions relating to the theoretical and computational aspects of the three features are addressed. GRA

N83-32097# New Mexico Univ., Albuquerque. Inst. for Engineering Research.
APPLICATION OF A THIRD-INVARIANT PLASTICITY THEORY TO CONCRETE AND SOILS Final Technical Report
Howard L. Schreyer Kirtland AFB, N. Mex. AFWL Mar. 1983 52 p refs
(Contract F29601-81-C-0013; AF Proj. 2307)
(AD-A127079; AFWL-TR-82-145; NMERI-8.13-TA8-25) Avail: NTIS HC A04/MF A01 CSCL 08/13

A viscoplastic constitutive model for frictional materials has been formulated. The approach is classical except that a nonassociated flow rule, and third invariants of stress and strain instead of the more conventional second invariants, are used. Theoretical and experimental results indicate good correlation for limit states and reasonable comparisons for deformations with a model that contains a small number of material parameters. Additional work is needed to improve the hardening and softening features of the model. Exploratory investigations were also conducted on the possibility of incorporating strain rate and cracking into the model. Preliminary results indicate that for both effects it may be possible to use the existing viscoplastic framework to provide a compact but comprehensive algorithm. If an interface is modeled as an existing crack, it may also be possible to handle interaction problems with the model. The primary focus of subsequent research will involve cracking, rate effects, and interface phenomena.
Author (GRA)

N83-32098# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mechanical Engineering.
STRESS ANALYSIS FOR ANISOTROPIC HARDENING IN FINITE-DEFORMATION PLASTICITY Interim Technical Report
E. H. Lee, R. L. Mallett, and T. B. Wertheimer 8 Nov. 1982 26 p refs
(Contract DAAG29-82-K-0016)
(AD-A127063; Rept-82-4; ARO-19063.2-EG) Avail: NTIS HC A03/MF A01 CSCL 12/1

Kinematic hardening represents the anisotropic component of strain hardening by a shift of the center of the yield surface in stress space. The current approach in stress analysis at finite deformation includes rotational effects by using the Jaumann derivatives of the shift and stress tensors. This procedure generates the unexpected result that oscillatory shear stress is predicated for monotonically increasing simple shear strain. A theory is proposed which calls for a modified Jaumann derivative based on the spin of specific material directions associated with the kinematic hardening. This eliminates the spurious oscillation. General anisotropic hardening is shown to require a similar approach.
Author (GRA)

N83-32099# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
THERMO-ELASTIC-PLASTIC ANALYSIS OF A THICK-WALLED CYLINDER WITH TEMPERATURE-DEPENDENT YIELD STRESS Final Technical Report
P. C. T. Chen Feb. 1983 24 p refs Presented at the 28th Conf. of Army Math., Bethesda, Md., 28-30 Jun. 1982
(DA Proj. 1L1-61102-AH-60)
(AD-A127447; ARLCB-TR-83005) Avail: NTIS HC A02/MF A01 CSCL 20/11

A numerical approach based on the finite-difference method and incremental solution procedure has been developed for analyzing the thermo-elastic-plastic problem of a thick-walled cylinder with temperature-dependent yield stress. The cylinder is subjected to a combination of internal pressure and temperature variation. The material is assumed to obey the von Mises' yield criterion, the associated flow theory, and the isotropic hardening rule. Some numerical results for the displacements and stresses are presented. Author (GRA)

N83-32100# Ames Lab., Iowa. Dept. of Civil Engineering.
SIMPLIFIED METHODS FOR THE INELASTIC ANALYSIS AND RELIABILITY ASSESSMENT OF STIFFENED SHELLS Ph.D. Thesis
Fouad Shanouda Fanous Jul. 1982 142 p refs
(Contract W-7405-eng-82)
(DE83-004966; IS-T-997) Avail: NTIS HC A07/MF A01

Despite the extreme precautions that are usually taken in the design and construction of nuclear power plant containment vessels, there is still a nonzero probability of radioactivity leakage from the containment. In view of this, a best estimate and uncertainty assessment of the containment structural resistance is needed. Simplified methods based upon limit analysis theories that take into account the effects of large deformations are presented. Methods for the prediction of the strength of stiffened containment vessels under uniform static internal pressure are developed. Finite element analyses are used to guide the formulation and calibration of these methods. Simplified dynamic analyses of locally loaded cylindrical shells, spherical shells and circular plates are given. The dynamic solution are obtained by idealizing the system as a single degree of freedom model. Several numerical examples are presented to illustrate the use of the proposed simplified dynamic and static analysis methods. Finally, a study of different reliability approaches is conducted. DOE

N83-32101# SRI International Corp., Menlo Park, Calif. Physical Sciences Div.
DYNAMIC FRACTURE BEHAVIOR OF STRUCTURAL MATERIALS Annual Report, Feb. 1982 - Feb. 1983
D. A. Shockey and J. H. Giovanola Mar. 1983 16 p refs
(Contract F49620-81-K-0007; AF Proj. 2306; SRI Proj. 2777)
(AD-A127902; AFOSR-83-0353TR; AR-2) Avail: NTIS HC A02/MF A01 CSCL 11/6

The goals of this project are to develop and apply procedures for obtaining more accurate measures of dynamic fracture initiation and propagation toughness and then to establish the relationship between them. We obtain the dynamic initiation toughness, K sub Id, by impacting unsupported edge-cracked bend specimens and using minimum-time crack instability criteria, and we obtain the dynamic propagation toughness, K sub ID, by measuring the temperature histories in material near the tip of a fast running crack. The research efforts on dynamic crack initiation and crack propagation will continue in the next two years and several structural alloys will be investigated. GRA

N83-32102# Dartmouth Coll., Hanover, N.H. School of Engineering.
THE BRITTLE TO DUCTILE TRANSITION IN POLYCRYSTALLINE ICE UNDER TENSION Final Report, 15 Jan. 1980 - 14 Jan. 1983
Erland M. Schulson 13 Apr. 1983 10 p refs
(Contract DAAG29-80-C-0064)
(AD-A127701; ARO-16861.2-GS) Avail: NTIS HC A02/MF A01 CSCL 08/12

The tensile strength of equiaxed and randomly oriented ice Ih decreases with increasing grain size and with increasing temperature. The strength of fine-grained aggregates (i.e., of aggregates finer than a critical grain size) is controlled by the stress to propagate cracks. The strength of coarse-grained material is controlled by the stress to nucleate cracks. GRA

N83-32103# Cambridge Univ. (England). Dept. of Metallurgy and Materials Science.
ELASTIC FIELDS UNDER A SPHERICAL INDENTER Annual Technical Report, Feb. 1982 - Feb. 1983
E. H. Yoffe Mar. 1983 24 p refs

(Contract DAJA37-82-C-0171; DA Proj. 1T1-61102-BH-57)
(AD-A127732) Avail: NTIS HC A02/MF A01 CSCL 12/1

In recent years there has been a great increase in the use of indentation techniques for testing and measuring mechanical properties of materials. The method has many practical advantages, but the interpretation of results for hard brittle materials relies heavily on the classical Hertzian theory of contact between elastic bodies. In particular, the theory provides formulae for the stress fields when a rigid spherical indenter is pressed on the flat surface of an elastic body. This theory is not exact, and since it is so widely used the present study was undertaken to form an estimate of the errors involved. The intention was to find a more accurate solution to the problem, and to compare this with the Hertzian approximation in various cases. Some values have been calculated and there are many more to be done before a reliable correction can be offered in every case. It is expected that this will provide a simple and useful check on the magnitude of errors introduced by the Hertz formulae interpreting experimental results. GRA

N83-32104# Pennsylvania State Univ., University Park. Lab. for Applied Research.
AN ANALYSIS OF CONICAL INDENTATION OF AN ELASTIC/PERFECTLY PLASTIC HALF-SPACE BY NONLINEAR FINITE ELEMENT TECHNIQUES M.S. Thesis
Takehiko Kato 26 Oct. 1982 118 p refs
(Contract N00024-79-C-6043)
(AD-A127529; ARL/PSU/TM-82-230) Avail: NTIS HC A06/MF A01 CSCL 20/11

A detailed analysis of the deformation and stress fields produced in an elastic/perfectly plastic half-space by a rigid conical indenter was performed using the elastic/plastic finite element code BOPAGE-3D. The analysis considers: the elastic deformation and stress fields with finite element results being compared to the closed-form solutions obtained by Sneddon, the elastic/plastic deformation and stress fields, and the residual deformation and stress fields which have not been analyzed to date. A special loading technique was developed to find the residual solutions. The included goals of the rigid conical indenter was set to A = 136 deg to simulate a Vickers pyramidal indenter. Idealized sodaline glass was chosen as an elastic/perfectly plastic brittle material. Stresses obtained during the loading-unloading cycle near the elastic/plastic boundary were tranformed to the principal stresses and the residual principal stresses to allow analysis of median, radial and lateral crack initiation and propagation. GRA

N83-32105# Pennsylvania State Univ., University Park. Dept. of Civil Engineering.
COMPUTER ANALYSIS FOR DYNAMIC RESPONSE OF BEAMS AND PLATES ON ELASTIC FOUNDATIONS Final Report, 1 Mar. - 15 Oct. 1982
M. C. Wang and A. Badie Jan. 1983 111 p
(Grant AF-AFOSR-0142-82; AF Proj. 2307)
(AD-A127504; AFOSR-83-0274TR) Avail: NTIS HC A06/MF A01 CSCL 09/2

The current Air Force Nondestructive Pavement Testing (NDPT) method requires a rational method to evaluate pavement layer modulus values. A reasonable step toward the development of such a method is computer analyses of elastic layered systems subjected to dynamic loading. This research adopts the Method of Direct Analysis which uses the impulse-momentum laws and constitutive relations but bypasses the explicit use of differential equations. As a result of the research, two computer programs were developed, one for infinite beams and the other for infinite plates both on elastic foundations. To demonstrate the effectiveness of the developed computer programs, response analyses were made for sustained, pulse and sinusoidal loadings. The results for sustained loading on an infinite beam agreed very well with an available exact solution. It was concluded that the Method of Direct Analysis is an effective tool for dynamic response analysis of elastic layered systems. Author (GRA)

N83-32106# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
OPTIMALITY CRITERION METHODS IN STRUCTURAL OPTIMIZATION Final Report, Apr. - Aug. 1981
N. S. Khot Oct. 1982 168 p refs
(AF Proj. 2401)
(AD-A127991; AFWA-TR-81-3124) Avail: NTIS HC A08/MF A01 CSCL 12/1

Optimization algorithms based on an optimal criterion to design a minimum weight structure are presented. The algorithms are derived for the direct design variable and the reciprocal design variable, and their relationship is discussed. The use of different algorithms and their effect on the convergence behavior is illustrated with sample problems. The presentation is limited to structures which can be analyzed by the finite element method and which are subjected to the constraints on stresses, displacements, minimum and maximum sizes and system stability. Author (GRA)

N83-32107# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
THERMAL-STRUCTURAL ANALYSIS OF LARGE SPACE STRUCTURES: A REVIEW OF RECENT ADVANCES Final Report, Aug. - Oct. 1981
Earl A. Thornton Wright-Patterson AFB, Ohio AFWAL Aug. 1982 46 p refs
(Contract F33601-81-M-B516; AF Proj. 2401)
(AD-A128016; AFWAL-TR-82-3048) Avail: NTIS HC A03/MF A01 CSCL 20/11

Recent advances in thermal-structural analysis of large space structures are reviewed. Thermal-structural analytical challenges faced by structural engineers are highlighted and uncertainties that arise in predictive analyses are identified and discussed. Current modeling techniques and characteristics of thermal-structural response are illustrated. Areas for further research are discussed, and the need for fundamental thermal-structural experiments is cited. Author (GRA)

N83-32108# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Ballistic Research Lab.
AN IMPROVED STRAIN HARDENING CHARACTERIZATION IN THE ADINA CODE USING THE MECHANICAL SUBLAYER MODEL Final Report
Aaron D. Gupta, Joseph M. Santiago, and Henry L. Wisniewski May 1983 44 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A128287; AD-F300234; ARBRL-TR-02484) Avail: NTIS HC A03/MF A01 CSCL 09/2

The Besseling-White sublayer model for simulating the nonlinear strain hardening behavior of plastically deforming solids has been implemented in the ADINA finite element computer program as an additional material option. The Besseling-White model, also called the mechanical sublayer model, simulates strain hardening behavior by superposing the stresses from an array of elastic-perfectly plastic elements, called sublayers. Sublayer properties are determined from a polygonal fit to the stress-strain curve. This new material option has been validated by comparing predictions using this model and the two linear hardening models (kinematic and isotropic) presently in the standard version of ADINA. Comparison of predictions for the transverse deflection history of an impulsively loaded clamped-edge circular plate shows a close correlation between the sublayer model and the kinematic hardening model and a somewhat poorer, but still reasonable, correlation between the sublayer model and the isotropic hardening model. GRA

N83-32109# Army Materials and Mechanics Research Center, Watertown, Mass. Materials Characterization Div.
A GENERAL PURPOSE RESIDUAL STRESS ANALYZER Final Report
Charles P. Gazzara Jan. 1983 29 p refs
(AD-A127820; AMMRC-TR-83-4) Avail: NTIS HC A03/MF A01 CSCL 20/11

An X-ray diffraction system (Rigaku Strainflex) for measuring residual stresses in both the laboratory and in the field, utilizing the same X-ray head, has been evaluated for Army applications. Procedures have been developed with assorted Army material for determining the residual stress levels in steel, aluminum, and uranium alloys. Standard calibration samples of steel and aluminum have been fabricated and tested for ensuring the accuracy of measurement on systems in the future. Recommendations have been made for improved X-ray devices to meet Army needs. This work was performed on a project under the same title, as part of the U.S. Army Materials Testing Technology Program at the Army Materials and Mechanics Research Center. Author (GRA)

N83-32110# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.

OPTIMUM DESIGN OF STIFFENED PLATES USING THE FINITE ELEMENT METHOD M.S. Thesis

Chil Sung Park Mar. 1983 61 p refs

(AD-A128556) Avail: NTIS HC A04/MF A01 CSCL 13/13

Stiffened plates are designed for minimum volume subject to constraints on: Von Mises maximum stresses, nodal displacements, height to thickness ratios of frame webs, and width to thickness ratios of frame flanges. Design variables are plate thickness and stiffener dimensions. A finite element analysis program is developed for the design of stiffened plates using numerical optimization techniques. The program may be used as a stand alone analysis tool or may be coupled to an optimizer of user's choice. Rectangular plate elements and frame elements are used for the idealization of stiffened plates. Design examples are presented to demonstrate the design method. Author (GRA)

N83-32111# Sandia Labs., Albuquerque, N. Mex.

WELD-CRACKING MECHANISMS IN AUSTENITIC STAINLESS STEELS

J. C. Lippold Sep. 1982 37 p refs Presented at Conf. on Trends in Welding Res. in the US, New Orleans, 16 Nov. 1981

(DE83-001157; SAND-82-8238; CONF-811184-3) Avail: NTIS HC A03/MF A01

The hot cracking susceptibility of several austenitic stainless steel filler wires and a Type 304L base material was evaluated using both the VARESTRAINT Test and a modified patch test. In general, alloys which solidified with ferrite as the primary phase and contained 5 to 12 volume percent ferrite in the as welded microstructure were more resistant to cracking than alloys which solidified as austenite. Fully austenitic Type 310 and highly ferritic Type 312 weld deposits were particularly sensitive to hot cracking and exhibited significant backfilling of fusion zone cracks. The higher alloy content of both Type 310 and type 312 promoted the formation of a greater proportion of eutectic constituents along fusion zone grain boundaries which serve to render these alloys more susceptible to crack formation. An investigation of hot cracking in autogeneous EB welds in Type 304L has also underscored the importance of solidification behavior on weld integrity. DOE

N83-32112# Oak Ridge National Lab., Tenn. Computer Sciences.

APPLICATIONS OF ENERGY-RELEASE-RATE TECHNIQUES TO PART-THROUGH CRACKS IN EXPERIMENTAL PRESSURE VESSELS

B. R. Bass, R. H. Bryan, J. W. Bryson, and J. G. Merkle 1982 11 p refs Presented at the ASME Winter Ann. Meeting, Phoenix, Ariz., 14-19 Nov. 1982

(Contract W-7405-eng-26)

(DE83-003486; CONF-821101-15) Avail: NTIS HC A02/MF A01

In nonlinear applications of computational fracture mechanics, energy release rate techniques are used increasingly for computing stress intensity parameters of crack configurations. Recently, deLorenzi used the virtual-crack-extension method to derive an analytical expression for the energy release rate that is better suited for three dimensional calculations than the well-known J-integral. Certain studies of fracture phenomena, such as pressurized-thermal-shock of cracked structures, require that crack tip parameters be determined for combined thermal and mechanical loads. A method is proposed that modifies the isothermal formulation of deLorenzi to account for thermal strains in cracked bodies. This combined thermo-mechanical formulation of the energy release rate is valid for general fracture, including nonplanar fracture, and applies to thermo-elastic as well as deformation plasticity material models. Two applications of the technique are described. In the first, semi-elliptical surface cracks in an experimental test vessel are analyzed under elastic-plastic conditions using the finite element method. The second application is a thick-walled test vessel subjected to combined pressure and thermal shock loadings. DOE

N83-32113# Fracture Control Corp., Goleta, Calif.

RECONSTITUTED CHARPY IMPACT SPECIMENS Final Report

J. S. Perrin, R. A. Wullaert, P. McConnell, W. L. Server, and E. O. Fromm Dec. 1982 61 p refs Sponsored by EPRI

(EPRI Proj. 2055-3)

(DE83-901113; EPRI-NP-2759) Avail: NTIS HC A04/MF A01

The arc stud welding process was used to produce new, full size Charpy V notch impact specimens from halves of previously tested Charpy specimens. The apparatus was developed such that it could be used not only for unirradiated specimens, but also so that it could be adapted for in cell use to produce new reconstituted specimens of irradiated material. The materials studied, of interest in nuclear applications, include A533B, A36, A516-80, submerged arc weld metal (A508 bae metal), HY80, cast duplex stainless steel, irradiated A533B, and irradiated submerged arc weld metal (A508 base metal). Both unirradiated and irradiated specimens were successfully produced and subsequently impact tested were compared. These was excellent agreement when the original curves to the subsequent curves generated with reconstituted specimens. DOE

N83-32114# Combustion Engineering, Inc., Windsor, Conn.

HIGH-TEMPERATURE ELASTIC-PLASTIC AND CREEP PROPERTIES FOR SA533 GRADE B CLASS I AND SA508 MATERIALS

G. B. Reddy and D. J. Ayres Dec. 1982 53 p Sponsored by EPRI

(EPRI Proj. 2055-8)

(DE83-901103; EPRI-NP-2763) Avail: NTIS HC A04/MF A01

Elastic-plastic and creep properties for typical reactor vessel materials at elevated temperatures are presented. These values were obtained experimentally. The materials tested were a single heat of SA533 Grade B Class 1 plate and a single heat of SA508 Class 2 forging material. Elastic-plastic properties for both materials were measured over the temperature range of 70 to 1200 F; creep properties of the materials were obtained over a temperature range of 750 to 1200 F. Uniaxial tensile tests were conducted on both materials using a modified creep machine and an automated data acquisition system. Loading, time, and strain were monitored for all tests. For the SA533 plate material, Young's modulus and yield strength were obtained from the test-generated stress-strain relationships. Also derived from these stress-strain curves were analytical expressions relating degree of plastic strain to level of applied stress. Uniaxial creep testing was performed on both materials for approximately 48 hours. Creep data for the SA533 plate material was used to formulate an analytical expression for creep strain as a function of stress, time, and temperature. This expression was then used to generate stress relaxation curves for the SA533 material. J.M.S.

N83-32115# Lockheed Missiles and Space Co., Palo Alto, Calif.

BUCKLING OF STEEL CONTAINMENT SHELLS. TASK 4: USE OF THE PANDA PROGRAM FOR SIMPLE BUCKLING ANALYSES OF STIFFENED CYLINDRICAL SHELLS Final Report, 25 Aug. 1980 - 30 Sep. 1982

D. Bushnell Dec. 1982 80 p refs

(DE83-900980; NUREG/CR-2836-Vol-4; LMSC-D-812950-Vol-4) Avail: NTIS HC A05/MF A01; Also Avail: SOD $5.00

The PANDA computer program was modified to permit calcula-

tion of critical load interaction curves for buckling of stiffened cylindrical shells with stiffeners running axially or circumferentially or both. Knockdown factors for geometric imperfections and plasticity reduction factors were introduced so that interaction curves can now be calculated for imperfect elastic-plastic shells. The knockdown factors and plasticity reduction factors are computed from a modified form of ASME Code Case N-284. The PANDA was checked by making numerous comparisons with tests on fabricated stiffened cylinders. DOE

N83-32116# Los Alamos Scientific Lab., N. Mex. Theoretical Div.
EFFECTS OF MICROSTRUCTURE ON THE SPEED AND ATTENUATION OF ELASTIC WAVES
J. E. Gubernatis and E. Domany (Weizmann Inst. of Science, Rehovoth, Israel) 1982 17 p refs Presented at the Rev. of Progr. in Quantitative NDE, San Diego, Calif., 1 Aug. 1982
(Contracts W-7405-eng-36; W-7405-eng-82)
(DE83-000671; LA-UR-82-2630; CONF-820820-4) Avail: NTIS HC A02/MF A01

A unified theory pertaining to the sensitivity of the propagation of an elastic wave to changes in the microstructural details of a material is discussed. In contrast to nearly all previous treatments a first principles approach, using developments from other multiple scattering problems and adapting them to the elastic wave case, is followed. Several simple, standard approximations are presented. In the process the validity of the commonly made assumption that alpha = n anti sigma is clarified, and the effective speed, illustrating its complementary character to the attenuation, is computed. The formal analysis necessary to treat systematically the dependency of the wave propagation on microstructural statistics is presented. DOE

N83-32117# Illinois Univ., Urbana. Dept. of Ceramic Engineering.
FRACTURE OF HOT-PRESSED SILICON NITRIDE AT ELEVATED TEMPERATURES Ph.D. Thesis
Sarah Huffsmith Knickerbocker 1983 304 p refs
(Contract DE-AC02-76ER-01198)
(DE83-005236; DOE/ER-01198/1395) Avail: NTIS HC A14/MF A01

Both MgO-doped and Al2O3-Y2O3-doped hot-pressed silicon nitrides were fractured between 1100 C and 1350 C in four-point bend at three displacement rates. Fracture stress and critical stress intensity factor were plotted vs temperature for each displacement rate. Fracture stress and critical stress intensity factor showed a strain rate dependence above 1200 C. The MgO-doped Si3N4 exhibited a peak in fracture stress before the values decreased at high temperatures. This peak corresponds to the onset of subcritical crack growth prior to catastrophic failure. Cavities and regions of grain boundary deformation were observed with SEM and TEM. A map was drawn of displacement rate versus temperature showing regions where subcritical cracking was and was not observed as well as a transition region. Both silicon nitrides exhibited a peak in effective critical stress intensity factor prior to the decrease. DOE

N83-32118# Lockheed Missiles and Space Co., Palo Alto, Calif.
BUCKLING OF STEEL-CONTAINMENT SHELLS. TASK 1B: BUCKLING OF WASHINGTON PUBLIC POWER SUPPLY SYSTEMS' PLANT NO. 2 CONTAINMENT VESSEL Final Report, 25 Aug. 1980 - 30 Sep. 1982
E. Meller and D. Bushnell Dec. 1982 124 p refs
(Contract NRC-FIN-B6568)
(DE83-901036; NUREG/CR-2836-Vol-1-Pt-2; LMSC-D-812950-Vol-1-Pt-2) Avail: NTIS HC A06/MF A01; also available HC SOD $6.00

Static buckling analyses of the steel containment vessel were conducted with use of several computer programs. The analyses were conducted as part of evaluation of two steel containment designs. Results are given from analyses of the containment as if it were axisymmetric and the second gives results from a STAGSC-1 model in which the largest penetration is included. Good agreement is obtained from analyses with BOSOR5 and STAGSC-1 for a case in which both of these computer programs were applied to the same configuration and loading. Predictions of collapse from STAGSC-1 indicate that the largest penetration of the WPPSS-2 containment vessel is reinforced such that there is no decrease in load carrying capability below that indicated from models in which this penetration is neglected. DOE

N83-32119# Ames Lab., Iowa.
SIMPLIFIED ANALYSIS OF SHELLS WITH LOCAL, IMPULSIVE LOADS
Fouad S. Fanous and Lowell F. Greimann 1982 27 p refs Presented at the Workshop on Containment Integrity for Nucl. Power Reactors, Arlington, Va., 7-9 Jun. 1982
(Contract W-7405-eng-82)
(DE83-003791; IS-M-384) Avail: NTIS HC A03/MF A01

The response of axisymmetric shells to localized impulsive loadings that produce large deformations and material nonlinearities are analyzed. Simplified methods for the prediction of the strain ductility of these shells are presented. The methods are developed by idealizing the structure as a single degree of freedom model. Large deformation effects are included and an elastic perfectly plastic material model is used. Several impulsive problems are analyzed using a finite element technique and the simplified solution. The agreement between the two results indicates that the simplified methods provide an accurate solution at a fraction of the cost of the finite element solution. DOE

42 GEOSCIENCES (GENERAL)

N83-32120# National Advisory Committee on Oceans and Atmosphere, Washington, D.C.
FINDINGS AND RECOMMENDATIONS ON VARIOUS MARINE, ATMOSPHERIC, AND COASTAL ZONE ISSUES Annual Report
Victoria J. Jones, ed. 30 Jun. 1982 89 p
(PB83-186213; NACOA-24; AR-11) Avail: NTIS HC A05/MF A01 CSCL 05D

The President, Members of Congress and Federal agency heads were provided with recommendations on the following subject areas: Atmospheric Science Research Facilities, Coastal Barriers, Legislation, Federal Regulation of Diving, NAVSTAR Global Positioning System, Oil Spill Liability and Compensation Legislation, Outer Continental Shelf Revenue Sharing, Section 404--Federal Dredge and Fill Permit Program. Areas also discussed in the report and under Committee review at the time of publication included: Hydrology, Marine and Coastal Fisheries, Marine Minerals, Marine Transportation, Provision of Weather Services to the Nation, U.S. Coast Guard, and Waste Management. Author (GRA)

N83-32121# Joint Publications Research Service, Arlington, Va.
USSR REPORT: EARTH SCIENCES, NO. 26
7 Jun. 1983 100 p refs Transl. into ENGLISH from various Russian articles
(JPRS-83622) Avail: NTIS HC A05

Reports obtained from USSR newspapers, periodicals, books, news agency transmissions, and broadcasts are presented. Subjects covered include: Meteorology, Oceanography, Terrestrial Geophysics, and Atmospheric Physics. For individual title, see N83-32122.

N83-32122# Joint Publications Research Service, Arlington, Va. c46
DRILLING AT ACCESSES TO EARTH'S MANTLE
L. N. Shadrin *In its* USSR Rept.: Earth Sci., No. 26 (JPRS-83622) 7 Jun. 1983 p 39-52 Transl. into ENGLISH from Priroda (Moscow), no. 1, Jan. 1983 p 12-22 (For primary document see N83-32121 20-42)
Avail: NTIS HC A05

Drilling into the deep layers of the Earth is discussed. Present

technology concerning shafts and boreholes is discussed in detail. L.F.M.

N83-32123# Joint Publications Research Service, Arlington, Va.
USSR REPORT: EARTH SCIENCES, NO. 27
6 Jul. 1983 71 p refs Transl. into ENGLISH from various Russian articles
(JPRS-83829) Avail: NTIS HC A04

Reports obtained from USSR newpapers, periodicals, books, news agency transmissions, and broadcasts are presented. Subjects covered include: Meteorology, Oceanography, Terrestrial Geophysics, and Atmospheric Physics. For individual titles, see N83-32124 through N83-32125.

N83-32124# Joint Publications Research Service, Arlington, Va.
PETROSYANTS INTERVIEWED ON RESULTS OF PIGAP PROGRAM **c47**
Z. Kanevskiy *In its* USSR Rept.: Earth Sci., No. 27 (JPRS-83829) 6 Jul. 1983 p 1-6 Transl. into ENGLISH from Znaniye-Sila (Moscow), no. 4, Apr. 1983 p 6-8 (For primary document see N83-32123 20-42)
Avail: NTIS HC A04

An interview with M. A. Petrosyants, Head of the Department of Meteorology and Climatology at Moscow State University is presented. The Global Atmospheric Research Program is discussed. L.F.M.

N83-32125# Joint Publications Research Service, Arlington, Va.
AUTOMATION OF HYDROPHYSICAL RESEARCH **c48**
B. O. Helyepo and H. V. Smyrnov *In its* USSR Rept.: Earth Sci., No. 27 (JPRS-83829) 6 Jul. 1983 p 12-19 refs Transl. into ENGLISH from Akad. Nauk Ukr. RSR (Kiev), no. 3, Mar. 1983 p 63-68 (For primary document see N83-32123 20-42)
Avail: NTIS HC A04

The need for development of new automatic measuring systems for Oceanography is discussed. Modular construction of these instruments for better utility and economic considerations is emphasized. L.F.M.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N83-32126*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A TRANSLATIONAL REGISTRATION SYSTEM FOR LANDSAT IMAGE SEGMENTS
Nelson de Jesus Parada, Principal Investigator, Guaraci Jose Erthal, Flavio Roberto Dias Velasco, and Nelson Delfino DAvila Mascarenhas Jun. 1983 7 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Encontro Nacl. de Automatica Soc. Brasil. de Mat., Belem, Para, 6-13 Jul. 1983 Sponsored by NASA ERTS
(E83-10373; NASA-CR-172917; NAS 1.26:172917;
INPE-2785-PRE/351) Avail: NTIS HC A02/MF A01 CSCL 05B

The use of satellite images obtained from various dates is essential for crop forecast systems. In order to make possible a multitemporal analysis, it is necessary that images belonging to each acquisition have pixel-wise correspondence. A system developed to obtain, register and record image segments from LANDSAT images in computer compatible tapes is described. The translational registration of the segments is performed by correlating image edges in different acquisitions. The system was constructed for the Burroughs B6800 computer in ALGOL language. M.G.

N83-32127*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CNPQ/INPE LANDSAT SYSTEM Report of Activities, 1 Oct. 1982 - 31 Mar. 1983
Nelson de Jesus Parada, Principal Investigator, Marcio Nogueira Barbosa, and Jose Borges Escada, Jr. Apr. 1983 26 p Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10374; NASA-CR-172918; NAS 1.26:172918;
INPE-2711-PRE/299) Avail: NTIS HC A03/MF A01 CSCL 05B

The current status of the Brazilian LANDSAT facilities is described and main accomplishments are outlined. Receiving, recording, and processing substations and data distribution centers are discussed. Examples of the preliminary TM product produced by the Brazilian station are given. M.G.

N83-32128*# Geological Survey, Reston, Va.
EVALUATION OF RADIOMETRIC AND GEOMETRIC CHARACTERISTICS OF LANDSAT-D IMAGING SYSTEM Quarterly Report
Lee U. Bender, M. H. Podwysocki, L. Rowan, and J. Salisbury, Principal Investigators Jul. 1983 3 p ERTS
(NASA Order S-12407-C)
(E83-10373; NASA-CR-172919; NAS 1.26:172919; QR-1) Avail: NTIS HC A02/MF A01 CSCL 05B

Problems, accomplishments, and significant results associated with the evaluation of the LANDSAT-D thematic mapper system are outlined. The higher resolution (over MSS) causes the TM data to approach more closely the quality of high altitude photographs. Thus far, it appears that the data can be used for map inspection and in certain instances for limited map revision. Image maps can be made at a scale of 1:100,000 and perhaps up to 1:62,500. It was also shown that TM data can help locate rocks containing minerals with high hydroxol content, such as clays, gypsum, alunite, and sericite. M.G.

N83-32129*# Agricultural Research Service, Mandan, N. Dak. Northern Great Plains Research Center.
THE WATER FACTOR IN HARVEST-SPROUTING OF HARD RED SPRING WHEAT
Armand Bauer and A. L. Black, Principal Investigators Feb. 1983 36 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E83-10376; NASA-CR-172920; EW-U3-04406; NAS 1.26:172920)
Avail: NTIS HC A03/MF A01 CSCL 02C

Sprouting in unthreshed, ripe, hard red spring wheat (Triticum aestivum L.) is induced by rain, but sprouting does not necessarily occur because the crop is wetted. The spike and grain water conditions conducive to sprouting were determined in a series of laboratory experiments. Sprouting did not occur in field growing wheat wetted to 110% water concentration until the spike water concentration was reduced to 12% and maintained at this concentration for 2 days before wetting. When cut at growth stage 11.3, Feekes scale, Saratovskaya 20 (USSR) sprouted after 4 days drying, Olaf and Alex between 7 and 15 days drying and Columbus, recognized for its resistance to harvest time sprouting, after more than 15 days drying. Sprouting potential was enhanced after 4 wetting drying cycles in which any wetted interval was too brief to permit sufficient water imbibition to initiate sprouting. At harvest ripeness, grain water concentration exceeded spike water concentration by 0.7 percentage units. Following 6 months storage, 20% of the kernels in 300 spike bundles (simulating windrows) sprouted within 28 hrs after initiation of wetting to saturation (150% water concentration). Ninety percent sprouting occurred within 8 days in bundles maintained at 75% water concentration and higher, but less sprouting occurred in bundles dried to 50% water concentration before resaturation. Author

N83-32130*# Agricultural Research Service, Mandan, N. Dak. Northern Great Plains Research Center.
RAIN-INDUCED SPRING WHEAT HARVEST LOSSES
Armand Bauer and A. L. Black, Principal Investigators Feb. 1983 34 p refs Sponsored by NASA, USDA, Dept. of Commerce,

Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E83-10377; NASA-CR-172921; EW-U3-04405; NAS 1.26:172921) Avail: NTIS HC A03/MF A01 CSCL 02C

When rain or a combination of rain and high humidity delay wheat harvest, losses can occur in grain yield and/or grain quality. Yield losses can result from shattering, from reduction in test weight, and in the case of windrowed grain, from rooting of sprouting grain at the soil: windrow contact. Losses in grain quality can result from reduction in test weight and from sprouting. Sprouting causes a degradation of grain proteins and starches, hence flour quality is reduced, and the grain price deteriorates to the value of feed grain. Although losses in grain yield and quality are rain-induced, these losses do not necessarily occur because a standing or windrowed crop is wetted by rain. Spike water concentration in hard red spring wheat must be increased to about 45-49% before sprouting is initiated in grain that has overcome dormancy. The time required to overcome this dormancy after the cultivar has dried to 12 to 14% water concentration differs with hard red spring cultivars. The effect of rain on threshing-ready standing and windrowed hard red spring wheat grain yeild and quality was evaluated. A goal was to develop the capability to forecast the extent of expected loss of grain yield and quality from specific climatic events that delay threshing. Author

N83-32131*# Agricultural Research Service, Weslaco, Tex.
THE EQUIVALENCE OF THREE TECHNIQUES FOR ESTIMATING GROUND REFLECTANCE FROM LANDSAT DIGITAL COUNT DATA
Arthur J. Richardson, Principal Investigator Apr. 1983 11 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E83-10378; NASA-CR-172922; EW-U3-04407; NAS 1.26:172922) Avail: NTIS HC A02/MF A01 CSCL 02C

The equivalence of three separate investigations that related LANDSAT digital count (DC) to ground measured reflectance (R) was demonstrated. One investigator related DC data to the cosZ, where Z is the solar zenith angle, for surfaces of constant R. The second investigator corrected the DC data to the solar zenith angle of 39 degrees before relating to surface R. Both of these investigators used LANDSAT 1 and 2 data from overpass dates 1972 through 1977. A third investigator calculated the relation between DC and R based on atmospheric radiative transfer theory. The equation coefficients obtained from these three investigators for all four LANDSAT MSS bands were shown to be equivalent although differences in ground reflectance measurement procedures have created coefficient variations among the three investigations. These relations should be useful for testing atmospheric radiative transfer theory. Author

N83-32132*# Missouri Univ., Columbia. Dept. of Atmospheric Science.
COMPARISON OF CRD, APU, AND STATE MODELS FOR IOWA CORN AND SOYBEANS AND NORTH DAKOTA BARLEY AND SPRING WHEAT
Vikki French May 1983 22 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E83-10379; NASA-CR-172923; YM-13-04419; NAS 1.26:172923) Avail: NTIS HC A02/MF A01 CSCL 02C

A comparison was made among the CEAS crop reporting district (CRD), agrophysical unit (APU), and state level multiple regression yield models for corn and soybeans in Iowa and barley and spring wheat in North Dakota. The best predictions were made by the state model for North Dakota spring wheat, by the APU models for barley, by the CRD models for Iowa soybeans, and by APU covariance models for Iowa corn. Because of this lack of consistency of model performance, CRD models would be recommended due to the availability of the data. Author

N83-32133*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
LANDSAT DATA PREPROCESSING
W. W. Austin Apr. 1983 72 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10380; NASA-CR-171672; EW-L3-04413; JSC-18877; NAS 1.26:171672; LEMSCO-18246) Avail: NTIS HC A04/MF A01 CSCL 02C

The effect on LANDSAT data of a Sun angle correction, an intersatellite LANDSAT-2 and LANDSAT-3 data range adjustment, and the atmospheric correction algorithm was evaluated. Fourteen 1978 crop year LACIE sites were used as the site data set. The preprocessing techniques were applied to multispectral scanner channel data and transformed data were plotted and used to analyze the effectiveness of the preprocessing techniques. Ratio transformations effectively reduce the need for preprocessing techniques to be applied directly to the data. Subtractive transformations are more sensitive to Sun angle and atmospheric corrections than ratios. Preprocessing techniques, other than those applied at the Goddard Space Flight Center, should only be applied as an option of the user. While performed on LANDSAT data the study results are also applicable to meteorological satellite data. Author

N83-32134*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
SIMULATION OF METEOROLOGICAL SATELLITE (METSAT) DATA USING LANDSAT DATA
W. W. Austin and W. E. Ryland May 1983 175 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10381; NASA-CR-171669; EW-L3-04414; JSC-18878; NAS 1.26:171669; LEMSCO-16928) Avail: NTIS HC A08/MF A01 CSCL 02C

The information content which can be expected from the advanced very high resolution radiometer system, AVHRR, on the NOAA-6 satellite was assessed, and systematic techniques of data interpretation for use with meteorological satellite data were defined. In-house data from LANDSAT 2 and 3 were used to simulate the spatial, spectral, and sampling methods of the NOAA-6 satellite data. A.R.H.

N83-32135*# California Univ., Santa Barbara. Dept. of Geography.
LANDSAT-D INVESTIGATIONS IN SNOW HYDROLOGY Quarterly Progress Report, 1 Apr. - 30 Jun. 1983
Jeff Dozier 30 Jun. 1983 23 p refs ERTS
(Contract NAS5-27463)
(E83-10382; NASA-CR-172924; NAS 1.26:172924) Avail: NTIS HC A02/MF A01 CSCL 05B

Thematic mapper data for the southern Sierra Nevada area were registered to digital topographic data and compared to LANDSAT MSS and NOAA-7 AVHRR data of snow covered areas in order to determine the errors associated with using coarser resolution and to qualify the information lost when high resolution data are not available. Both the zenith and the azimuth variations in the radiative field are considered in an atmospheric radiative transfer model which deals with a plane parallel structured atmosphere composed of different layers, each assumed to be homogeneous in composition and to have a linear in tau temperature profile. Astronomical parameters for each layer are Earth-Sun distance and solar flux at the top of the atmosphere. Atmospheric parameters include pressure temperature, chemical composition of the air molecules, and the composition and size of the aerosol, water droplets, and ice crystals. Outputs of the model are the monochromatic radiance and irradiance at each level. The use of the model in atmospheric correction of remotely sensed data is discussed. A.R.H.

N83-32136*# Geological Survey, Reston, Va.
A PRELIMINARY EVALUATION OF LANDSAT-4 THEMATIC MAPPER DATA FOR THEIR GEOMETRIC AND RADIOMETRIC ACCURACIES
M. H. Podwysocki, L. U. Bender, N. Falcone, and O. D. Jones [1983] 18 p refs Sponsored by NASA Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10383; NASA-CR-172925; NAS 1.26:172925) Avail: NTIS HC A02/MF A01 CSCL 05B

Some LANDSAT thematic mapper data collected over the eastern United States were analyzed for their whole scene geometric accuracy, band to band registration and radiometric accuracy. Band ratio images were created for a part of one scene in order to assess the capability of mapping geologic units with contrasting spectral properties. Systematic errors were found in the geometric accuracy of whole scenes, part of which were attributable to the film writing device used to record the images to film. Band to band registration showed that bands 1 through 4 were registered to within one pixel. Likewise, bands 5 and 7 also were registered to within one pixel. However, bands 5 and 7 were misregistered with bands 1 through 4 by 1 to 2 pixels. Band 6 was misregistered by 4 pixels to bands 1 through 4. Radiometric analysis indicated two kinds of banding, a modulo-16 stripping and an alternate light dark group of 16 scanlines. A color ratio composite image consisting of TM band ratios 3/4, 5/2, and 5/7 showed limonitic clay rich soils, limonitic clay poor soils, and nonlimonitic materials as distinctly different colors on the image.
Author

N83-32137*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PRELIMINARY STATISTICAL STUDIES CONCERNING THE CAMPOS RJ SUGAR CANE AREA, USING LANDSAT IMAGERY AND AERIAL PHOTOGRAPHS [ESTUDOS ESTATISTICOS PRELIMINARES SOBRE A REGIAO CANAVIEIRA DE CAMPOS - RJ, UTILIZANDO IMAGENS LANDSAT E FOTOGRAFIAS AEREAS]
Nelson de Jesus Parada, Principal Investigator, Samuel R. X. Costa, Lourdes Bernadete F. C. Paiao, Francisco J. Mendonca, Yosio E. Shimabukuro, and Valdete Duarte Apr. 1983 16 p refs In PORTUGUESE Sponsored by NASA ERTS
(E83-10384; NASA-CR-172926; NAS 1.26:172926;
INPE-2723-NTE/200) Avail: NTIS HC A02/MF A01 CSCL 02C

The two phase sampling technique was applied to estimate the area cultivated with sugar cane in an approximately 984 sq km pilot region of Campos. Correlation between existing aerial photography and LANDSAT data was used. The two phase sampling technique corresponded to 99.6% of the results obtained by aerial photography, taken as ground truth. This estimate has a standard deviation of 225 ha, which constitutes a coefficient of variation of 0.6%.
N.W.

N83-32138*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
APPLICATION OF MSS/LANDSAT IMAGES TO THE STRUCTURAL STUDY OF RECENT SEDIMENTARY AREAS: CAMPOS SEDIMENTARY BASIN, RIO DE JANEIRO, BRAZIL [APLICACOES DE IMAGENS MSS/LANDSAT NO ESTUDO ESTRUTURAL DE AREAS SEDIMENTARES RECENTES BACIA SEDIMENTAR DE CAMPOS RIO DE JANEIRO - BRASIL]
Nelson de Jesus Parada, Principal Investigator and Marx Prestes Barbosa May 1983 36 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA ERTS
(E83-10385; NASA-CR-172927; NAS 1.26:172927;
INPE-2738-RPE/434) Avail: NTIS HC A03/MF A01 CSCL 08G

Visual and computer aided interpretation of MSS/LANDSAT data identified linear and circular features which represent the "reflexes" of the crystalline basement structures in the Cenozoic sediments of the emergent part of the Campos Sedimentary Basin.
Author

N83-32139*# Delaware Univ., Newark. Coll. of Marine Studies.
EVALUATION OF SPATIAL, RADIOMETRIC AND SPECTRAL THEMATIC MAPPER PERFORMANCE FOR COASTAL STUDIES Quarterly Status and Technical Progress Report, 1 Apr. - 31 Jun. 1983
V. Klemas 31 Jun. 1983 4 p ERTS
(Contract NAS5-27580)
(E83-10386; NASA-CR-172928; NAS 1.26:172928) Avail: NTIS HC A02/MF A01 CSCL 05B

Radiative transfer theory was used to model upwelling radiance for an orbiting sensor viewing an estuarine environment. Radiance was calculated in Tm bands 3,4, and 5 and MSS bands 4 and 5 for an optically shallow estuary of either clear or turbid water, and of three bottom types: vegetation, sand, or mud. A portion of a TM image of Chesapeake Bay was enhanced to obtain a quick look at what submerged features could be detected. The enhancements were compared with low altitude color aerial photography. The TM bands 1,2, and 3 were found to contain water and submerged features information. Band 1 contained a significant amount of noise and low contrast. Band 2 appeared to contain the most amount of bottom information. Band 3, while having the least amount of noise and best constrast, contained a lesser amount of bottom information because of increase water absorption. Several water signatures were identified which correlated with submerged vegetation shown in the aerial photography.
A.R.H.

N83-32140*# Earth Satellite Corp., Chevy Chase, Md.
GEOLOGIC EXPLORATION: THE CONTRIBUTION OF LANDSAT-4 THEMATIC MAPPER DATA
John R. Everett, Jon D. Dykstra, and Charles A. Sheffield [1983] 13 p Sponsored by NASA ERTS
(E83-10387; NASA-CR-172929; NAS 1.26:172929) Avail: NTIS HC A02/MF A01 CSCL 08G

The major advantages of the TM data over that of MSS systems are increased spatial resolution and a greater number of narrow, strategically placed spectral bands. The 30 meter pixel size permits finer definition of ground features and improves reliability of the photointerpretation of geologic structure. The value of the spatial data increases relative to the value of the spectral data as soil and vegetation cover increase. In arid areas with good exposure, it is possible with careful digital processing and some inventive color compositing to produce enough spectral differentiation of rock types and thereby produce facsimiles of standard geologic maps with a minimum of field work or reference to existing maps. Hue-saturation value images are compared with geological maps of Death Valley, California, the Big Horn/Wind River Basin of Wyoming, the area around Cement, Oklahoma, and Detroit. False color composites of the Ontario region are also examined.
A.R.H.

N83-32141*# California Univ., Santa Barbara. Dept. of Geography.
LANDSAT-D INVESTIGATIONS IN SNOW HYDROLOGY Quarterly Progress Report
Jeff Dozier [1983] 23 p refs Sponsored by NASA ERTS
(Contract NAS5-27463)
(E83-10388; NASA-CR-172930; NAS 1.26:172930) Avail: NTIS HC A02/MF A01 CSCL 08H

Two tapes of the southern Sierra Nevada study area were received and the TM data are being registered to digital data. The spectral, spatial, temporal, and economic characteristics of data from LANDSAT 4 TM and MSS were compared with those of NOAA-r AVHRR data for snow cover mapping. An atmospheric radiative transfer model which accounts for both the zenith and aximuth variation in the radiative field is presented and its advantages are discussed. A Monte Carlo method for solving the atmospheric correction problem for an inhomogeneous surface is also considered.
A.R.H.

N83-32142*# Earth Satellite Corp., Chevy Chase, Md.
STUDY OF LANDSAT-D THEMATIC MAPPER PERFORMANCE AS APPLIED TO HYDROCARBON EXPLORATION Quarterly Progress Report, 7 Apr. - 7 Jul. 1983
7 Jul. 1983 4 p ERTS

(Contract NAS5-27384)
(E83-10389; NASA-CR-172931; NAS 1.26:172931; QPR-3) Avail: NTIS HC A02/MF A01 CSCL 05B

Many scenes of particular interest have a light dusting of snow cover. The possible use of hue-saturation-intensity transformations to reduce the effect of snow cover is being investigated. A tape of the Greeley, Colorado scene was reviewed on the interactive system and image types to be produced (decorrelated 2,3,4; natural color 1,2,3,; hue separation value 5/2,5/7 eigen 1; 4,5,7 in two color combinations) were selected. In several instances, a 1,3,4 combination produces a more useful false color infrared version of TM data than the more common 2,3,4 arrangement, probably because band 1 is less highly correlated with the band 3 and 4 than is band 2. A review of spacecraft performance suggests that the standard corrections applied at GSFC are more complicated than necessary in some areas and insufficient in other cases. The image motion compensation device on the TM works so well that bow-typing effects are very small; there are differences in the radiometry of forward and backward scans that make additional calibration necessary. A.R.H.

N83-32143*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
INVESTIGATION OF SEVERAL ASPECTS OF LANDSAT-4 DATA QUALITY Quarterly Progress Report
Robert C. Wrigley, Principal Investigator 20 Jun. 1983 5 p Sponsored by NASA ERTS
(E83-10390; NASA-TM-85335; NAS 1.15:85335; QPR-2) Avail: NTIS HC A02/MF A01 CSCL 05B

No insurmountable problems in change detection analysis were found when portions of scenes collected simultaneously by LANDSAT 4 MSS and either LANDSAT 2 or 3. The cause of the periodic noise in LANDSAT 4 MSS images which had a RMS value of approximately 2DN should be corrected in the LANDSAT D instrument before its launch. Analysis of the P-tape of the Arkansas scene shows bands within the same focal plane very well registered except for the thermal band which was misregistered by approximately three 28.5 meter pixels in both directions. It is possible to derive tight confidence bounds for the registration errors. Preliminary analyses of the Sacramento and Arkansas scenes reveals a very high degree of consistency with earlier results for bands 3 vs 1, 3 vs 4, and 3 vs 5. Results are presented in table form. It is suggested that attention be given to the standard deviations of registrations errors to judge whether or not they will be within specification once any known mean registration errors are corrected. Techniques used for MTF analysis of a Washington scene produced noisy results. A.R.H.

N83-32144*# *California Univ., Santa Barbara.*
SNOW REFLECTANCE FROM THEMATIC MAPPER
Jeff Dozier [1983] 9 p refs Sponsored by NASA Original photography may be purchased from EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10391; NASA-CR-172933; NAS 1.26:172933) Avail: NTIS HC A02/MF A01 CSCL 05B

Calculations of snow reflectance in all 6 TM reflective bands (i.e., 1,2,3,4,5, and 7) using a delta Eddington model show that snow reflectance in bands 4,5, and 7 is sensitive to grain size. Efforts to interpret the surface optical grain size for the spectral extension of albedo are described. Results show the TM data include spectral channels suitable for snow/cloud discrimination and for snow albedo measurements that can be extended throughout the solar spectrum. Except for band 1, the dynamic range is large enough that saturation occurs only occasionally. The finer resolution gives much better detail on the snowcovered area and might make it possible to use textural information instead of the snowline as an index to the amount of snow melt runoff. A.R.H.

N83-32145*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
IMPACT OF LANDSAT MSS SENSOR DIFFERENCES ON CHANGE DETECTION ANALYSIS
William C. Likens and Robert C. Wrigley [1983] 21 p refs Sponsored by NASA Original photography may be purchased from EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10395; NASA-TM-85336; NAS 1.15:85336) Avail: NTIS HC A02/MF A01 CSCL 05B

Some 512 by 512 pixel subwindows for simultaneously acquired scene pairs obtained by LANDSAT 2,3 and 4 multispectral band scanners were coregistered using LANDSAT 4 scenes as the base to which the other images were registered. Scattergrams between the coregistered scenes (a form of contingency analysis) were used to radiometrically compare data from the various sensors. Mode values were derived and used to visually fit a linear regression. Root mean square errors of the registration varied between .1 and 1.5 pixels. There appear to be no major problem preventing the use of LANDSAT 4 MSS with previous MSS sensors for change detection, provided the noise interference can be removed or minimized. Data normalizations for change detection should be based on the data rather than solely on calibration information. This allows simultaneous normalization of the atmosphere as well as the radiometry. A.R.H.

N83-32146*# Rochester Inst. of Tech., N. Y. Dept. of Imaging and Photographic Science.
COMPARISON OF MODELLED AND EMPIRICAL ATMOSPHERIC PROPAGATION DATA Quarterly Report
John R. Schott and Joseph D. Biegel 15 Jun. 1983 3 p refs Presented at the SPIE 27th Ann. Intern. Tech. Symp., San Diego, Calif., 1983 Submitted for publication ERTS
(Contract NAS5-27323)
(E83-10398; NASA-CR-172940; NAS 1.26:172940; QR-3) Avail: NTIS HC A02/MF A01 CSCL 05B

The radiometric integrity of TM thermal infrared channel data was evaluated and monitored to develop improved radiometric preprocessing calibration techniques for removal of atmospheric effects. Modelled atmospheric transmittance and path radiance were compared with empirical values derived from aircraft underflight data. Aircraft thermal infrared imagery and calibration data were available on two dates as were corresponding atmospheric radiosonde data. The radiosonde data were used as input to the LOWTRAN 5A code which was modified to output atmospheric path radiance in addition to transmittance. The aircraft data were calibrated and used to generate analogous measurements. These data indicate that there is a tendancy for the LOWTRAN model to underestimate atmospheric path radiance and transmittance as compared to empirical data. A plot of transmittance versus altitude for both LOWTRAN and empirical data is presented. A.R.H.

N83-32147*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SATELLITE DATA DISTRIBUTION SYSTEM (SDDS). THE DEVELOPMENT AND DEMONSTRATION OF NEW FISHERIES SUPPORT PRODUCTS BASED ON REMOTE OCEAN SENSING FROM SATELLITES
1 May 1980 23 p Sponsored by NASA ERTS
(E83-10399; NASA-TM-85334; NAS 1.15:85334) Avail: NTIS HC A02/MF A01 CSCL 08A

A technical approach is outlined which builds on the existing data distribution system (developed and operated under the SEASAT data utilization program project) to distribute tailored products to more fisherman using cooperative facilities and expertise. Under the proposed concept, JPL would implement and manage a 30 month demonstration program involving a combination of commercial, educational, and government organizations. Daily fisheries depiction charts and fisheries aids charts as well as weekly see surface temperature analyses and semiweekly fisheries outlooks can enhance fishing operations and tactics. In addition to satellite observations for analyzing sea surface temperature and for initializing the atmospheric Primitive Equation forecast of surface pressure, TIROS-N cloud imagery and the coastal zone scanner on NIMBUS-7 can provide indications of areas favorable to concentration of fish foods/nutrients. Water color summaries and sea surface temperature microstructure patterns can be included in the fisheries aids charts. A.R.H.

N83-32148# General Accounting Office, Washington, D. C.
WATER CONSERVATION: AN UPDATE OF FEDERAL ACTIVITY
22 Apr. 1983 35 p refs
Avail: NTIS HC A03/MF A01

Federal involvement in water conservation is reviewed. Author

N83-32149# Committee on Foreign Relations (U. S. Senate).
GLOBAL TRENDS IN POPULATION AND RESOURCES
Washington GPO 1982 202 p refs Hearing before the Comm. on Foreign Relations, 97th Congr., 2d Sess., 23 Jun. 1982
(GPO-96-841) Avail: Subcomm. on Intern. Econ. Policy

The usefulness of global modeling of trends in population and resources is considered. Author

N83-32150*# Municipality of Anchorage, Alaska. Planning Dept.
INTEGRATED RESOURCE INVENTORY FOR SOUTHCENTRAL ALASKA (INTRISCA) Final Report
Tony Burns, Charlotte Carson-Henry, and Leslie A. Morrissey Jul. 1981 265 p refs Prepared in cooperation with Technicolor Government Services, Inc. Original contains color illustrations
(Contract NAS2-11101)
(NASA-CR-166514; NAS 1.26:166514) Avail: NTIS HC A12/MF A01 CSCL 05B

The Integrated Resource Inventory for Southcentral Alaska (INTRISCA) Project comprised an integrated set of activities related to the land use planning and resource management requirements of the participating agencies within the southcentral region of Alaska. One subproject involved generating a region-wide land cover inventory of use to all participating agencies. Toward this end, participants first obtained a broad overview of the entire region and identified reasonable expectations of a LANDSAT-based land cover inventory through evaluation of an earlier classification generated during the Alaska Water Level B Study. Classification of more recent LANDSAT data was then undertaken by INTRISCA participants. The latter classification produced a land cover data set that was more specifically related to individual agency needs, concurrently providing a comprehensive training experience for Alaska agency personnel. Other subprojects employed multi-level analysis techniques ranging from refinement of the region-wide classification and photointerpretation, to digital edge enhancement and integration of land cover data into a geographic information system (GIS). Author

N83-32151*# Technicolor Government Services, Inc., Moffett Field, Calif.
THE ABAG BIOGENIC EMISSIONS INVENTORY PROJECT Final Report
Charlotte Carson-Henry, ed. Sep. 1982 166 p refs
(Contract NAS2-11101)
(NASA-CR-166498; NAS 1.26:166498) Avail: NTIS HC A08/MF A01 CSCL 13B

The ability to identify the role of biogenic hydrocarbon emissions in contributing to overall ozone production in the Bay Area, and to identify the significance of that role, were investigated in a joint project of the Association of Bay Area Governments (ABAG) and NASA/Ames Research Center. Ozone, which is produced when nitrogen oxides and hydrocarbons combine in the presence of sunlight, is a primary factor in air quality planning. In investigating the role of biogenic emissions, this project employed a pre-existing land cover classification to define areal extent of land cover types. Emission factors were then derived for those cover types. The land cover data and emission factors were integrated into an existing geographic information system, where they were combined to form a Biogenic Hydrocarbon Emissions Inventory. The emissions inventory information was then integrated into an existing photochemical dispersion model. Author

N83-32152# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Mapping, Charting and Geodesy Div.
OPTICAL CHARACTER RECOGNITION FOR AUTOMATED CARTOGRAPHY: THE ADVANCED DEVELOPMENT HANDPRINTED SYMBOL RECOGNITION SYSTEM
Robert M. Brown and C. F. Cheng (Computer Sciences Corp.) Mar. 1983 98 p refs
(AD-A127566; NORDA-TN-187) Avail: NTIS HC A05/MF A01 CSCL 08/2

This NORDA Technical Note is composed of five chapters. The first chapter presents an overview of optical character recognition (OCR) and its relation to the automated cartography environment. It provides the DMA Subtask objectives and discusses them in the light of symbol digitizing and information transformations. The division of a total OCR system into data acquisition/document management and isolated character recognition is considered along with NORDA's recent tasking (FY-82) prototype for DMA production centers. Chapter Two presents a discussion of the different ways in which recognition systems are constructed. In particular, it considers the differences in approach necessary for constrained and free-form OCR. Chapter Three describes the DMA environment in which a handprinted OCR system must operate and discusses performance requirements. The general structure of the Handprinted Symbol Recognition System is outlined in Chapter Four. This material considers the key issues of information content, problems in the thinning or vectorization of a character, shape measurement and feature extraction, and finally character recognition or labeling. The interaction between each of these elements is emphasized. Chapter Five provides a brief summary of the current Subtask accomplishments and status along with areas where work is in progress toward developing other handprinted OCR capabilities for DMA. GRA

N83-32153# Army Engineer Topographic Labs., Fort Belvoir, Va.
INTERTIAL SURVEY APPLICATION TO CIVIL WORKS
Edward F. Roof Jan. 1983 79 p refs
(AD-A127508; ETL-0309) Avail: NTIS HC A05/MF A01 CSCL 17/7

This report contains a basic explanation of inertial survey systems presently being used; Operational results in their use and an analysis of their potential use by the Corp of Engineers in support of Civil Works projects. Author (GRA)

N83-32154# Naval Postgraduate School, Monterey, Calif.
METHODS OF HYDROGRAPHIC SURVEYING USED BY DIFFERENT COUNTRIES M.S. Thesis
Athanasios Elia Palikaris Mar. 1983 172 p refs
(AD-A128576) Avail: NTIS HC A08/MF A01 CSCL 08/10

Specifications, procedures, methods and techniques for hydrographic surveying employed by different countries have been examined and compared with each other as well as with the IHO recommended standards. The agencies within the considered countries are the U.S. National Ocean Survey, the British Hydrographic Department, the Canadian Hydrographic Service and the Hellenic Navy Hydrographic Service. Topics covered include the establishment of horizontal control, connection of sounding datums to vertical control, conventional hydrographic methods and automation. Of particular interest are the Canadian classification of horizontal control through the concept of confidence region, the root mean square error (drms) adopted by the U.S. NOS for the development of position specifications and the Canadian variation of the bar check method for the determination of echo sounder corrections. Author (GRA)

N83-32155# Pacific Northwest Lab., Richland, Wash.
WATEQ3 GEOCHEMICAL MODEL: THERMODYNAMIC DATA FOR SEVERAL ADDITIONAL SOLIDS
Kenneth M. Krupka and Everett A. Jenne Sep. 1982 58 p refs
(Contract DE-AC06-76RL-01830)
(DE83-000896; PNL-4276) Avail: NTIS HC A04/MF A01

Geochemical models such as WATEQ3 can be used to model the concentrations of water-soluble pollutants that may result from the disposal of nuclear waste and retorted oil shale. However, for a model to competently deal with these water-soluble pollutants, an adequate thermodynamic data base must be provided that includes elements identified as important in modeling these pollutants. To this end, several minerals and related solid phases

were identified that were absent from the thermodynamic data base of WATEQ3. In this study, the thermodynamic data for the identified solids were compiled and selected from several published tabulations of thermodynamic data. For these solids, an accepted Gibbs free energy of formation was selected for each solid phase based on the recentness of the tabulated data and on considerations of internal consistency with respect to both the published tabulations and the existing data in WATEQ3. DOE

N83-32156# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
ORIENTATION STUDY OF NORTHERN ARKANSAS. NATIONAL URANIUM RESOURCE EVALUATION PROGRAM. HYDROGEOCHEMICAL AND STEAM-SEDIMENT RECONNAISSANCE
Kenneth F. Steele Aug. 1982 130 p refs
(Contracts DE-AC09-76SR-00001; DE-AC13-76GJ-01664)
(DE83-001214; GJBX-212-82; DPST-81-141-25) Avail: NTIS HC A07/MF A01

Samples of ground water, stream water, and sediment were collected at 335 sites for an orientation study of northern Arkansas. Each stream site consisted of both sediment and stream water (if available), and each sediment sample was sieved to produce four size fractions for analysis. The orientation area included all or parts of Benton, Carroll, Madison, and Washington Counties. Several black shales, including the Chattanooga Shale, crop out in this area, and the Sylamore Sandstone Member has local radiation anomalies. The following analyses were performed for all water samples (both ground water and stream water): pH, conductivity, total alkalinity, temperature, nitrate, ammonia, phosphate and sulfate. Additional water was collected, filtered, and reacted with a resin that was then analyzed by neutron activation analysis for U, Br, Cl, F, Mn, Na, Al, and Dy. In addition, ground water samples were analyzed for He. The stream sediments were analyzed by neutron activation for U, Th, Hf, Ce, Fe, Mn, Sc, Ti, V, Al, Dy, Eu, La, Sm, Yb, and Lu. DOE

N83-32157# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE, ORIENTATION STUDY OF CENTRAL LOUISIANA: NATIONAL URANIUM RESOURCE EVALUATION PROGRAM
Kenneth F. Steele and William M. Fay Aug. 1982 82 p refs
(Contracts DE-AC09-76SR-00001; DE-AC13-76GJ-01664)
(DE83-001217; GJBX-198-82; DPST-81-141-27) Avail: NTIS HC A05/MF A01

A hydrogeochemical and stream sediment orientation survey was conducted in 1350 sq mi area of central Louisiana, primarily in LaSalle and Catahoula parishes. This area was chosen for study because the outcrop and subsurface Catahoula Formation in this area has the requisite major channel systems and volcanic material for the formation of uranium deposits. Two hundred stream sediment samples were collected and sieved yielding four size fractions for analysis. The sediments were analyzed by neutron activation analysis for U, Th, Hf, Ce, Fe, Mn, Sc, Ti, V, Al, Dy, Eu, La, Sm, Yb, and Lu. The water from these streams was analyzed for the following in the field - pH, conductivity, total alkalinity, temperature, nitrate, ammonia, phosphate, and sulfate. The stream water was analyzed for the following elements by neutron activation - U, Al, Br, Cl, Dy, F, Mg, Mn, Na, and V. Two hundred ground water sites were also collected and analyzed for the same field data and essentially the same elements as the stream water. DOE

N83-32158# Pacific Northwest Lab., Richland, Wash.
REVIEW OF GROUND-WATER FLOW AND TRANSPORT MODELS IN THE UNSATURATED ZONE
C. A. Oster Nov. 1982 170 p refs
(Contract DE-AC06-76RL-01830)
(DE83-004256; NUREG/CR-2917; PNL-4427) Avail: NTIS HC A08/MF A01

Models of partially saturated flow and transport in porous media have applications in the analysis of existing as well as future low level radioactive waste facilities located above the water table. An extensive literature search along with telephone and mail correspondence with recognized leading experts in the field, was conducted to identify computer models suitable for studies of low level radioactive waste facilities located in the unsaturated zone. Fifty-five existing models were identified as potentially useful. Ten of these models were selected for further examination. A statement of the ground water flow contaminant transport problem, a discussion of those methods used to reduce the physical problem to a computer model and a brief discussion about the data requirements of these models are given. The procedure used to select the ten codes for further discussion is given, along with a list of these models. DOE

N83-32159# Pacific Northwest Lab., Richland, Wash.
REVIEW AND EVALUATION OF PALEOHYDROLOGIC METHODOLOGIES
M. G. Foley, D. A. Zimmerman, J. M. Doesburg, and P. D. Thorne Dec. 1982 90 p refs
(Contract DE-AC06-76RL-01830)
(DE83-004572; NUREG/CR-3055; PNL-4346) Avail: NTIS HC A05/MF A01; Also Avail: SOD $5.50

A literature review was conducted to identify methodologies that could be used to interpret paleohydrologic environments. The review was conducted to evaluate how well these methodologies could be applied to the siting of low level radioactive waste facilities. The computer literature search queried five bibliographical data bases containing over five million citations of technical journals, books, conference papers, and reports. Two data base searches and a manual search were also conducted. The methodologies were examined for data requirements and sensitivity limits. Paleohydrologic interpretations are uncertain because of the effects of time on hydrologic and geologic systems and because of the complexity of fluvial systems. Paleoflow determinations appear in many cases to be order of magnitude estimates. However, the methodologies identified mitigate this uncertainty when used collectively as well as independently. DOE

N83-32160# Bergbau-Forschung G.m.b.H., Essen (West Germany).
SYSTEMATIC STUDIES ON COALS OF DIFFERENT DEPOSITS, INCLUDING THEIR MINERAL MATTER Final Report, Mar. 1982
Lothar Kuehn, Horst Plogmann, Rolf-Werner Schliephake, and Evamarie Wolff-Fischer Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 84 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-068; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,50

Coal petrology and mineralogy of coal samples from various deposits of different geological age are discussed. Degree of reflexion and maceral group composition, content of macerals and maceral-types of the vitrinite and inertinite group (coking and hydrogenation); degree of bituminization of vitrinites (coking and hydrogenation); and intergrowth of macerals in coal-grains (coking and gasification) were studied. Methods of determining mineral matter of coal were improved, especially for clay minerals. An illite from the productive carboniferous of the Ruhr region was chemically characterized. The behavior of mineral matter during hydrogenation and allothermal gasification with water vapor was investigated on residues of pilot plants. Author (ESA)

N83-32161# Hawaii Univ., Manoa. Dept. of Geology and Geophysics.
NATURAL LANDMARKS SURVEY OF THE ISLANDS OF THE PACIFIC Final Report
Agatin T. Abbott, E. Alison Kay, and Charles H. Lamoreaux 30 Sep. 1982 203 p refs Sponsored by National Park Service
(PB83-182501) Avail: NTIS HC A10/MF A01 CSCL 05K

This study is one of the 61 which cover the natural regions of the United States, defined largely by Fenneman (1928). Each study describes the ecological and/or geological features characteristic of that region, then evaluates sites representative of the various features. Sites which are outstanding examples are suggested as potential National Natural Landmarks. This report describes

25 sites of ecologic and geologic significance throughout the Pacific Island Territories natural region. GRA

N83-32162# Geological Survey, St. Paul, Minn. Water Resources Div.
PRELIMINARY EVALUATION OF THE GROUND-WATER-FLOW SYSTEM IN THE TWIN CITIES METROPOLITAN AREA, MINNESOTA Final Water-Resources Investigations Report
John H. Guswa, Donald I. Siegel, and Daniel C. Gillies Aug. 1982 73 p refs Prepared in cooperation with Metropolitan Council of the Twin Cities Area, St. Paul, Minn., and Minnesota Dept. of Natural Resources, St. Paul
(PB83-174599; USGS/WRD-WRI-83-006; USGS/WRI-82-44) Avail: NTIS HC A04/MF A01 CSCL 08H

A preliminary quasi-three-dimensional finite-difference ground-water-flow model of the seven-county Twin Cities Metropolitan area was constructed and used to evaluate parameter sensitivity and adequacy of available data. Fourteen geologic units that underlie the study area were grouped into nine hydrogeologic units and were incorporated into a five-layer model. Analyses of available data and results of steady-state simulations indicate that critical data needs for improving the simulation model include spatial and temporal variations in ground-water withdrawals and potentiometric levels, and hydraulic properties of the drift filling or partly filling bedrock valleys. Areal distribution of calcium, sodium, sulfate, and chloride concentrations were analyzed to provide information on the hydrologic and geochemical relationships between aquifers. GRA

N83-32163# Florida Univ., Gainesville. Dept. of Agronomy.
EVAPOTRANSPIRATION ESTIMATES BASED ON SURFACE TEMPERATURE AND NET RADIATION: DEVELOPMENT OF REMOTE SENSING METHODS
K. F. Heimburg, L. H. Allen, Jr., and W. C. Huber 20 Dec. 1982 224 p refs
(Contract DI-14-34-0001-0110)
(PB83-175307; WRRC-PUB-66; W83-02185; OWRT-A-040-FLA(1)) Avail: NTIS HC A10/MF A01 CSCL 08H

A generalized method for making evapotranspiration estimates using satellite data is presented. It is designed for good cumulative ET estimates based on surface temperature, air temperature, and net radiation data of limited time resolution. The surface is described by an equation relating surface to air temperature gradients, net radiation, moisture availability, bulk air thermal conductivity, saturation deficit, and a soil heat flux parameter. Given estimates of two of these factors, the other two can be determined from the correlation of temperature gradients and net radiation. GRA

N83-32164# Utah State Univ., Logan. Water Research Lab.
EVALUATION OF WATER CONSERVATION TECHNIQUES IN THE UPPER COLORADO RIVER BASIN
Rangesan Narayanan and Douglas R. Franklin Dec. 1982 50 p refs
(Contract DI-14-34-0001-9137)
(PB83-175315; UWRL/P-82/07; W83-02186; OWRT-B-185-UT(1)) Avail: NTIS HC A03/MF A01 CSCL 08H

The Upper Colorado River Basin contains large deposits of oil shale, tar sands, crude oil, coal, and natural gas. Agriculture still accounts for 90 percent of the water depletions, but future development of these energy resources is expected to take increasing amounts of water. A mixed integer programming model was used to maximize returns to land, water, and mineral resources. The results were used to assess the need for government sponsored water conservation measures to supplement water saving techniques employed by the private sectors in response to increased water prices. The feasibilities of various water saving techniques by industries and of various government sponsored water conservation measures were examined within a benefit cost analysis framework. Author (GRA)

N83-32165# West Virginia Univ., Morgantown. Water Research Inst.
IMPROVING WATERSHED-MODEL ACCURACY BY USING DIGITAL TOPOGRAPHY
Robert N. Eli and Michael J. Paulin 1983 65 p refs
(Contract DI-14-34-0001-1152)
(PB83-178137; W83-02233; OWRT-A-046-WVA(1)) Avail: NTIS HC A04/MF A01 CSCL 08H

An 11 square-mile watershed was modeled using three different resolution-triangulated digital-terrain models. The number of triangular elements varied from 176 to 784. The objective was to test the sensitivity of a distributed unit-hydrograph model to changing element size. Each Triangular element and stream segment was modeled as a sequential linear-resevoir/linear-channel element. It was determined that the overland-flow elements were relatively insensitive to lag-time proportioning, while the stream segments were relatively sensitive. Author (GRA)

N83-32166# National Weather Service, Anchorage, Alaska.
DAILY FLOW STATISTICS OF ALASKAN STREAMS
David L. Chapman Oct. 1982 62 p refs
(PB83-180133; NOAA-TM-NWS-AR-35; NOAA-83031001) Avail: NTIS HC A04/MF A01 CSCL 08H

Frequent requests to compare current river flow to the normal flow, when to expect spring breakup, when to expect the highest flow of the year, etc., led to a statistical analysis of daily flows at all Alaskan stations for which sufficient discharge records are available. The results are presented. GRA

N83-32167# Arizona Water Resources Research Center, Tucson.
BIBLIOGRAPHY ON GROUND-WATER RECHARGE IN ARID AND SEMIARID AREAS
Susan J. Keith, Patricia Paylore, K. J. DeCook, and L. G. Wilson Jul. 1982 158 p
(Contract DI-14-34-0001-1483)
(PB83-182055; W83-02362; OWRT-C-00155-T(1483)(1)) Avail: NTIS HC A08/MF A01 CSCL 08H

This bibliography provides references on natural and man-caused recharge in arid and semiarid areas. The literature on natural recharge includes citations on stream channel recharge, mountain recharge, mountain front recharge, and precipitation infiltration recharge. The literature on man-caused recharge includes citations on recharge from activities such as irrigation, mining, and waste water treatment and disposal. Author (GRA)

N83-32168# North Dakota Water Resources Research Inst., Fargo.
MECHANISMS, DISTRIBUTION AND FREQUENCY OF GROUND-WATER RECHARGE IN UPLAND AREAS OF WESTERN NORTH DAKOTA Technical Completion Report, Oct. 1976 - Sep. 1979
Bernd W. Rehm, William M. Peterson, and Gerald H. Groenewold Sep. 1982 80 p refs
(Contract DI-14-34-0001-9036)
(PB83-182121; OWRT-A-061; NDAK(1)-A-061-NDAK(1); Rept-75) Avail: NTIS HC A05/MF A01 CSCL 08H

Groundwater recharge mechanisms have been examined at a specific site in Western North Dakota. Estimates of groundwater recharge presented here are based on a network of piezometers and water-table wells within the study area Falkirk, ND. These data were supplemented with observations on evapotranspiration rates, soil moisture content changes, and stable isotope concentrations. Stable isotope data indicate that much of the water at or above the water table during the spring resembles snowmelt or slough waters. The spatial distribution of recharge is largely dependent upon two factors - the size of surface depressions and underlying lithology. Author (GRA)

N83-32169# Geological Survey, Indianapolis, Ind. Water Resources Div.
GROUND-WATER RESOURCES OF THE WHITE RIVER BASIN, HAMILTON AND TIPTON COUNTIES, INDIANA Final Report
Leslie D. Arihood Nov. 1982 78 p refs Prepared in cooperation with Indiana State Dept. of Natural Resources, Indianapolis
(PB83-184309; USGS/WRD/WRI/83-007; USGS/WRI-82-48)

Avail: NTIS HC A05/MF A01 CSCL 08H

The ground water resources of the White River basin in Hamilton and Tipton Counties were investigated by first collection driller logs, ground water levels, stream flow measurements, and pumping data. These data were used to map five confined sand and gravel aquifers interbedded in till, a bedrock aquifer, and an unconfined outwash aquifer. Both two and three dimensional ground water flow models were constructed which provided estimates of the ground water potential in terms of yield, drawdown and streamflow depletion. Author (GRA)

N83-32170# Idaho Univ., Moscow.

REMOTE SENSING DETERMINATION OF HYDROGRAPH RECESSION CHARACTERISTICS Water and Energy Resources Research Inst.

Gerald A. Willett Dec. 1982 25 p refs

(Contract DI14-34-0001-2114)

(PB83-186627; W83-02487; OWRT-A-086-IDA(1)) Avail: NTIS HC A03/MF A01 CSCL 08H

A review of literature indicates that little work is being done on determining base or minimum flows from basin characteristics using remote sensing techniques. The majority of the work being done on base flows is by the use of mathematical models using information that can be obtained from topographic maps. Remote sensing techniques have been used mainly for determining water quality, inventories, and determining hydrological characteristics that could be determined from topographic maps as well. Information obtainable by the use of remote sensing should be useful for revising existing mathematical models to provide more accurate predictions of not only base or minimum flows but of average and peak flows. GRA

N83-32171# Purdue Univ., Lafayette, Ind. Water Resources Research Center.

STATISTICAL ANALYSIS OF THE DAILY STREAMFLOW HYDROGRAPH AND A PROBABILITY DISTRIBUTION OF THE INTERARRIVAL TIMES OF PEAK FLOWS-APPLICATION TO INDIANA

M. L. Kavvas and J. W. Delleur Jan. 1983 128 p refs

(Contract DI-14-34-0001-0219)

(PB83-187153; PWRRC-TR-147; W83-02408;

OWRT-B-112-IND(5)) Avail: NTIS HC A07/MF A01 CSCL 08H

A periodic statistical analysis of the daily streamflows at five gaging stations in Indiana was performed to gain insight into the stochastic structure which governs the daily stream process. This analysis made use of the mean function and the covariance function of the daily streamflows as well as the probability distribution of the interarrival times between peak discharges and the probability distribution of the times to the peak discharges. It is shown that the daily streamflow process is annually periodic in all its statistic functions and that the persistence properties and the recession decay rates change with the state of the watershed storage and with time. Author (GRA)

N83-32172# Idaho Univ., Moscow. Water and Energy Resources Research Inst.

USE OF REMOTE SENSING TECHNIQUES AND THE UNIVERSAL SOIL LOSS EQUATION TO DETERMINE SOIL EROSION

K. M. Schuchard and L. C. Tennyson Dec. 1982 33 p refs

(Contract DI-14-34-0001-2114)

(PB83-182006; W83-02326; OWRT-A-080-IDA(1)) Avail: NTIS HC A03/MF A01 CSCL 08M

Satellite data with ancillary watershed information was used to determine soil erosion of agriculture, forest and range lands in the southern portion of the Hangman Creek watershed, Benewah County, Idaho. Vegetation cover types derived from satellite data and the VICAR/IBIS image processing computer software package were determined with 89% accuracy. The vegetation cover types identified on the study area were dense-mixed forest, medium density mixed forest, ponderosa pine forest, wheat, lentils, barley, bluegrass, pasture and brush. Soil erosion (tons/acre/year) was estimated with the Universal Soil Loss Equation. Author (GRA)

N83-32173# Virginia Polytechnic Inst. and State Univ., Blacksburg. Water Resources Research Center.

LEGAL AND ADMINISTRATIVE SYSTEMS FOR WATER ALLOCATION AND MANAGEMENT: OPTIONS FOR CHANGE. SEVEN PERSPECTIVES ON ASPECTS OF WATER RESOURCE PLANNING IN THE SOUTHEASTERN STATES

William R. Walker, ed., William E. Cox, ed., and Margaret S. Hrezo, ed. 1983 427 p refs

(PB83-187120; W83-02404; OWRT-B-123-VA(1)) Avail: NTIS HC A19/MF A01 CSCL 05D

This report analyzes seven aspects of water resources planning and management and their implications for the southeastern United States. Its purpose is to provide an assessment of alternatives for changes in the water law of the Southeast. Allocation of Supplies Among Competing Offstream users Within the Basin' suggests that permit systems offer improved capability for balancing public and private interests in water but that this option may be too severe for states with a general abundance of water resources. Options assessed in 'Accommodating Interwatershed Transfer Under the Riparian Doctrine' include a declaration that any water use is protected from actions for damages in the absence of material injury, establishment of reasonableness as the sole criterion for evaluating the legal standing of a nonriparian use and adoption of a procedure for protecting inbasin water users. GRA

N83-32174# Montana Water Resources Research Center, Bozeman.

EFFECTS OF SNOW COMPACTION ON WATER RELEASE AND SEDIMENT YIELD, BRIDGER BOWL SKI AREA, GALLATIN COUNTY, MONTANA Final Report

Thomas R. Grady, Stephan G. Custer, and John Montagne Jun. 1982 25 p refs

(Contract DI-14-34-0001-0128)

(PB83-186445; MWRRC-124; W83-02491;

OWRT-A-126-MONT(1)) Avail: NTIS HC A02/MF A01 CSCL 05K

Little is known regarding the impact of ski compaction on runoff and sediment yield in downhill ski areas. This study uses a paired watershed approach to analyze the impact of snow compaction on runoff timing, hydrograph peak height, and sediment yield. Results show that compacted snow releases water to streams 7-14 days later than uncompacted snow. The delay of snow melt from the compacted snow which reduces the rate of heat transfer by water movement, impedes the development of wet snow grains, and so delays the release of water. For the basins compared in the study, snow compaction had little effect on sediment yield.

Author (GRA)

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N83-32175* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THERMIONIC ENERGY CONVERTERS Patent

James F. Morris, inventor (to NASA) Issued 8 Dec. 1983 6 p Filed 19 Feb. 1981 Supersedes N81-19561 (19 - 10, p 1368)

(NASA-Case-LEW-12443-1; US-Patent-4,373,142;

US-Patent-Appl-SN-235797; US-Patent-Class-310-306) Avail: US Patent and Trademark Office CSCL 10A

The efficiency of thermionic energy converters is improved by internal distribution of tiny sorted cesium diodes driven by the thermal gradient between the primary emitter and the collector.

The tiny, sorted diode distribution comprises protrusions of the emitter material from the main emitter face which contact the main collector face thermally but not electrically. The main collector ends of the protrusions are separated from the main collector by a thin layer of insulation, such as aluminum oxide. The shorted tiny diode distribution augments cesium ionization through internal thermal effects only within the main diode. No electrical inputs are required. This ionization enhancement by the distribution of the tiny shorted diodes not only reduces the plasma voltage drop but also increases the power output and efficiency of the overall thermionic energy converter.

Official Gazette of the U.S. Patent and Trademark Office

N83-32176* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

ADVANCED INORGANIC SEPARATORS FOR ALKALINE BATTERIES AND METHOD OF MAKING THE SAME Patent

Dean W. Sheibley, inventor (to NASA) Issued 1 Feb. 1983 5 p Filed 22 Dec. 1981

(NASA-Case-LEW-13171-2; US-Patent-4,371,596; US-Patent-Appl-SN-333537; US-Patent-Class-429-144; US-Patent-Class-429-251; US-Patent-Class-429-254; US-Patent-Class-29-623.5) Avail: US Patent and Trademark Office CSCL 10C

A flexible, porous battery separator includes a coating applied to a porous, flexible substrate. The coating comprises: (1) a thermoplastic rubber-based resin which is insoluble and unreactive in the alkaline electrolyte, (2) a polar organic plasticizer which is reactive with the alkaline electrolyte to produce a reaction product which contains a hydroxyl group and/or a carboxylic acid group, and (3) a mixture of polar particulate filler materials which are unreactive with the electrode. The mixture comprises at least one first filler material having a surface area of greater than 25 sq meters/gram, at last one second filler material having a surface area of 10 to 25 sq meters/gram. The volume of the mixture of filler materials is less than 45% of the total volume of the fillers and the binder. The filler surface area per gram of binder is about 20 to 60 sq meters/gram, and the amount of plasticizer is sufficient to coat each filler particle.

Official Gazette of the U.S. Patent and Trademark Office

N83-32177* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

HIGH VOLTAGE V-GROOVE SOLAR CELL Patent

John C. Evans, An-Ti Chai, and Chandra P. Goradia, inventors (to NASA) Issued 15 Mar. 1983 6 p Filed 18 Mar. 1982 Supersedes N82-24717 (20 - 15, p 2122)

(NASA-Case-LEW-13401-2; US-Patent-4,376,872; US-Patent-Appl-SN-359388; US-Patent-Class-136-249; US-Patent-Class-357-30) Avail: US Patent and Trademark Office CSCL 10A

A high voltage multijunction solar cell comprises a number of discrete voltage generating regions, or unit cells, which are formed in a single semiconductor wafer and are connected together so that the voltages of the individual cells are additive. The unit cells comprise doped regions of opposite conductivity types separated by a gap. The method includes forming V-shaped grooves in the wafer and orienting the wafer so that ions of one conductivity type can be implanted in one face of the groove while the other face is shielded. A metallization layer is applied and selectively etched away to provide connections between the unit cells.

Official Gazette of the U.S. Patent and Trademark Office

N83-32178* National Aeronautics and Space Administration, Washington, D. C.

ENERGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES

Apr. 1983 296 p

(NASA-SP-7043(37); NAS 1.21:7043(37)) Avail: NTIS HC A13/MF A01 CSCL 10B

This bibliography lists 1169 reports, articles, and other documents introduced into the NASA scientific and technical information system from January 1, 1983 through March 31, 1983. Author

N83-32179 Miami Univ., Coral Gables, Fla. Clean Energy Research Inst.

INDIRECT SOLAR WIND GEOTHERMAL: ALTERNATIVE ENERGY SOURCES 4, VOLUME 4

T. Nejat Veziroglu, ed. 1982 19 p refs

(LC-82-71533; ISBN-0-250-40557-1) Copyright. Avail: Issuing Activity

The utilities are obliged to provide electricity in a reliable and cost effective manner. Some unique problems posed by large scale wind turbines as an electricity source have to be considered. A value model is presented which is based upon the fuel displacement capability and the capacity displacement capability of wind turbines. The amount of fossil fuels which is saved by wind turbines depends on the forecasted wind power output, the actual power output fluctuations of the wind turbines and on system operation. The highly controversial capacity credit of wind turbines is discussed under the aspect of system reliability. It is shown that calculations of the capacity credit should be based upon detailed investigations with regard to the time dependence of the hourly wind power output. Author

N83-32180*# Raytheon Co., Waltham, Mass. Microwave Power Tube Div.

DESIGN STUDY FOR A GOUND MICROWAVE POWER TRANSMISSION SYSTEM FOR USE WITH A HIGH-ALTITUDE POWERED PLATFORM Final Report

W. C. Brown Jun. 1983 136 p refs

(Contract NAS6-3200)

(NASA-CR-168344; NAS 1.26:168344; PT-6052) Avail: NTIS HC A07/MF A01 CSCL 10B

The conceptual design of a ground-based microwave power transmission system is described. This system is intended to supply electrical power via an air link to a high-altitude (21 km) powered platform. The platform must be equipped with the required instrumentation (RECTENNA) to convert the RF energy to dc power. Author

N83-32181# Systech Corp., Xenia, Ohio.

SURVEY OF FOREIGN SYSTEMS FOR INCINERATION AND ENERGY RECOVERY Progress Report, Jun. - Nov. 1982

Richard Frounfelker and Brian A. Hausfeld Port Hueneme, Calif. NCEL Apr. 1983 137 p refs

(Contract N62583-82-MT-150)

(AD-A127461; NCEL-CR-83.025) Avail: NTIS HC A07/MF A01 CSCL 13/2

Solid waste heat recovery incinerator (HRI) facilities outside the United States, which were capable of 24-hour a day operation, had operated for about a year, and had combustors of between 0.75 and 3.0 ton/hr capacity were identified to permit selection of best facilities for field visits. Of the 40 vendors identified, 21 responses were received. Eleven of the vendors had facilities that fit the above criteria. Facilities of six vendors were selected for field visits. GRA

N83-32182# Minnesota Univ., Minneapolis. Dept. of Mechanical Engineering.

HYDROGEN AND OXYGEN FROM WATER. PART 6: QUENCHING THE EFFLUENT FROM A SOLAR FURNACE Interim Technical Report

Richard B. Diver, Stephen Pederson, Todd Kappauf, and Edward A. Fletcher 15 Apr. 1983 26 p refs Submitted for publication

(Contracts N00014-82-K-0423; DE-AC02-82ER-12089; NR Proj. 625-830; NR Proj. 359-830)

(AD-A127457; TR-3) Avail: NTIS HC A03/MF A01 CSCL 07/2

Numerical integration of a set of rate equations applicable to the hydrogen-oxygen system suggests that it should be possible to recover H2 and O2 by rapid cooling of low-pressure equilibrium mixtures from a solar furnace. Using the University of Minnesota 4.2 m solar furnace, we were able to recover explosive mixtures of H2 and O2 from water which had been heated to about 2100K. The numerical calculations and the experiment are described. GRA

N83-32183# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Coll. of Engineering.
DESIGN, CONSTRUCTION, TESTING AND EVALUATION OF A RESIDENTIAL ICE STORAGE AIR CONDITIONING SYSTEM M.S. Thesis Florida Univ.
J. Jay Santos and Thomas A. Ritz Dec. 1982 123 p refs
(AD-A128582; AFIT-NR-82-83T) Avail: NTIS HC A06/MF A01 CSCL 13/1

The experimental system was used to supply cooling to a single wide trailer and performance data were compared to a conventional air conditioning system of the some capacity. Utility rate information was collected from over one hundred major utility companies and used to evaluate economic comparison of the two systems. The ice storage system utilized reduced rate time periods to accommodate ice while providing continuous cooling to the trailer. The economic evaluation resulted in finding that the ice storage system required over 50% more energy than the conventional system. Although a few of the utility companies offered rate structures which would result in savings of up to $200 per year, this would not be enough to offset higher initial costs over the life of the storage system. Recommendations include items that would have to be met in order for an ice storage system to be an economically viable alternative to the conventional system. GRA

N83-32184# AEG-Telefunken, Frankfurt am Main (West Germany). Forschungsinst.
SCHOTTKY AND MIS TYPE AMORPHOUS-SILICON SOLAR CELLS Final Report, Jun. 1981
Michael Milleville, Dieter Leidich, Ekkehard Niemann, and Roland Fischer Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 62 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-043; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13

Thin films of hydrogenated amorphous silicon were prepared by reactive plasma deposition in a high frequency glow discharge of silane. Structural, electrical and optical properties of these films were investigated in order to ensure the quality required for the fabrication of solar cells. Two types of solar cell structure were prepared, Schottky barrier cells and MIS cells with a thin insulating layer of SiOx. The cells were optimized with respect to type and sheet resistance of the substrate, thickness of the active layer, and thickness of the insulating layer. Author (ESA)

N83-32185# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
OCEAN ENERGY SYSTEM AT THE JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY Quarterly Report, Jul. - Sep. 1982
Dennis Richards, W. H. Avery, D. Richards, and E. J. Francis Oct. 1982 39 p refs Sponsored in part by DOE
(PB83-180034; JHU/APL/OQR-82-3) Avail: NTIS HC A03/MF A01 CSCL 10A

The Johns Hopkins University Applied Physics laboratory, is engaged in developing Ocean Thermal Energy Conversion (OTEC) systems that will provide synthetic fuels (e.g., methanol), energy intensive products such as ammonia (for fertilizers and chemicals), and aluminum. The work also includes assessment and design concepts for hybrid plants, such as geothermal-OTEC (GEOTEC) plants. APL has been designated the Lead Laboratory in these areas by DOE/DOET. Another effort that began in the spring of 1982 is a technical advisory role to DOE with respect to their management of the conceptual design activity of the two industry teams that are designing offshore OTEC pilot plants that could deliver power to Oahu, Hawaii. Author (GRA)

N83-32186# Perkins and Will, Inc., Washington, D.C.
ENERGY CONSERVATION FOR HOUSING: A WORKBOOK
May 1982 319 p refs Prepared in cooperation with Ehrenkrantz Group, Washington, D.C.
(Contract HUD-H-2850R)
(PB83-185330; HUD-0002651; HUD/PDR-700) Avail: NTIS HC A14/MF A01 CSCL 10A

Multifamily housing project managers can reduce their energy costs from 30 to 60 percent by capitalizing on a variety of energy conservation opportunities (ECO's) identified in HUD research on the physical condition of public housing stock. This workbook prepares managers for this planning and for making individualized energy audits. It provides all the materials they need to proceed, including analysis sheets for calculating costs - benefit and payback periods for each of the 50 ECO's described. The ECO's listed all into four general categories: architectural improvements to the energy design of the building envelope; heating system ECO's to increase energy efficiency; secondary ECO's related to the domestic water supply, air conditioning systems, and central laundry equipment; and electric system ECO's reducing utility surcharges and increasing light bulb efficiency. Author (GRA)

N83-32187# National Bureau of Standards, Washington, D.C. National Engineering Lab.
PERFORMANCE ANALYSIS OF THE JERSEY CITY TOTAL ENERGY SITE Final Report
C. W. Hurley, J. D. Ryan, and C. W. Phillips Aug. 1982 408 p refs Sponsored by Dept. of Housing and Urban Development
(PB83-185348; NBSIR-82/2474; HUD-0002654) Avail: NTIS HC A18/MF A01 CSCL 10B

Engineering, economic, environmental, and reliability data from a 486 - unit apartment/commercial complex was gathered. The complex was designed to recover waste heat from diesel engines to make the central equipment building a total energy (TE) plant. Analysis of the data indicates that a significant savings in fuel is possible by minor modifications in plant procedures. The results of an analysis of the quality of utility services supplied to the consumers on the site and an analysis of a series of environmental tests made the effects of the plant on air quality and noise are included. In general, although those systems utilizing the TE concept showed a significant savings in fuel, such systems do not represent attractive investments compared to conventional systems. GRA

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N83-32188# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Biology.
ECOLOGICAL CONSEQUENCES OF A CO2-INDUCED CLIMATIC CHANGE ON FOREST ECOSYSTEMS, VOLUME 2, PART 13
W. Carter Johnson and David M. Sharpe Oct. 1982 37 p refs 2 Vol.
(Contract DE-AS01-79EV-10019)
(DOE/EV-10019/13-Vol-2-Pt-13) Avail: NTIS HC A03/MF A01

Biography, population and ecosystem dynamics, disturbance, and land use and forest utilization are discussed. Population-ecosystem modeling, climate-ecosystems interrelationships, spatio-geographic modeling, organismic tolerance-genetic heterogeneity, keystone and indicator species, spatial resolution of models, land use, biological monitoring, site selection, and bioclimatic data base are addressed. Author

N83-32189# San Diego State Univ., Calif.
RESEARCH NEEDED TO DETERMINE THE PRESENT CARBON BALANCE OF NORTHERN ECOSYSTEMS AND THE POTENTIAL EFFECT OF CARBON DIOXIDE INDUCED CLIMATE CHANGE
Oct. 1982 64 p refs 2 Vol.
(Contract DE-AS01-79EV-10019)
(DOE/EV-10019/14-Vol-2-Pt-14) Avail: NTIS HC A04/MF A01

The current areal extent of carbon accumulation in the peat in the arctic and the taiga, and predicted future carbon accumulation rates based on the present understanding of controlling processes and on the understanding of past climates and vegetation are

summarized. Research needed to fill major gaps in the understanding of the role of northern ecosystems in global climate change is outlined. Author

N83-32190# General Accounting Office, Washington, D. C. Resources, Community and Economic Development Div.
INFORMATION ON OCEAN DISPOSAL OF MUNICIPAL AND INDUSTRIAL WASTE
18 May 1983 42 p refs
(GAO/RCED-83-161; B-166506) Avail: NTIS HC A03/MF A01

Ocean dumping and municipal and industrial waste disposal are addressed. Author

N83-32191# Committee on Small Business (U. S. House).
UREA-FORMALDEHYDE FOAM INSULATION
Washington GPO 1983 153 p refs Hearing on H. R. 6389 and H. R. 6391 before the Subcomm. on Energy, Environ., and Safety Issues Affecting Small Business of the Comm. on Small Business, 97th Congr., 2d Sess., 4 Aug. 1982
(GPO-12-485) Avail: Subcomm. on Energy, Environ., and Safety Issues Affecting Small Business

Legislations providing low-interest loans of up to $10,000 each for the purpose of removing and replacing urea-formaldehyde from insulation is documented. Author

N83-32192# Committee on Science and Technology (U. S. House).
DEFORESTATION: ENVIRONMENTAL IMPACT AND RESEARCH NEEDS
Washington GPO 1983 205 p Joint Hearing before the Comm. on Sci. and Technol. and the Comm. on Foreign Affairs, 97th Congr., 2d Sess., No. 161, 16 Sep. 1982
(GPO-12-976) Avail: Subcomm. on Natural Resources, Agriculture Res. and Environ.

The status of research on environmental problems that are produced by the phenomena of global deforestation is examined. Author

N83-32193# KVB, Inc., Irvine, Calif.
NO-x EMISSIONS FROM PULVERIZED-COAL ARCH-FIRED BOILERS Final Report
T. W. Sonnichsen Dec. 1982 118 p refs Sponsored by EPRI (EPRI Proj. 1339-1)
(DE83-901472; EPRI-CS-2813) Avail: NTIS HC A06/MF A01

A study has been conducted to assess the NO/sub x/ emission characteristics of three subbituminous pulverized-coal arch-fired utility boiler configurations. These boiler arrangements are unique in that the coal is introduced downward from the arch into the furnace with the bulk of the combustion air added through the front wall perpendicular to the flame jet. Inherent staged combustion conditions are thereby generated which have been shown to be conductive to low NO/sub x/ emissions. The intent of the program was to evaluate these designs as alternatives to developing low NO/sub x/ combustion systems and, if appropriate, suggest adoption of the combustion conditions in these boilers to the design of modern utility boilers. Field tests were conducted to determine as found NO/sub x/ emission levels and the influence of combustion modifications on these emissions. NO/sub x/ levels (corrected to 3% O2) ranged rom 200 ppM to 350 ppM. DOE

N83-32194# Pacific Northwest Lab., Richland, Wash.
CRITICAL CONSIDERATIONS IN THE ASSESSMENT OF HEALTH AND ENVIRONMENTAL RISKS: WHAT WE HAVE LEARNED FROM THE NUCLEAR EXPERIENCE
B. E. Vaughan Oct. 1982 10 p refs Presented at the 21st Hanford Life Sci. Symp. on Biological Availability of Trace Metals, Richland, Wash., 4 Oct. 1981
(Contract DE-AC06-76RL-01830)
(DE83-005292; PNL-SA-9939; CONF-811035-6) Avail: NTIS HC A02/MF A01

Recommendations for modelling the environmental exposure pathways for both radioactive and chemical effluents are presented. DOE

N83-32195# Pacific Northwest Lab., Richland, Wash.
INTERPRETATIONS OF THE OSCAR DATA FOR REACTIVE-GAS SCAVENGING
R. C. Easter and J. M. Hales Nov. 1982 14 p refs Presented at the 4th Intern. Conf. on Precipitation Scavenging, Dry Deposition and Resuspension, Santa Monica, Calif., 29 Nov. - 3 Dec. 1982
(Contract DE-AC06-76RL-01830)
(DE83-003597; PNL-SA-10917; CONF-821136-5) Avail: NTIS HC A02/MF A01

A description is given of the application of a reactive scavenging model for the interpretation of data from the Oxidation and Scavenging Characteristics of April Rains (OSCAR) field study to evaluate scavenging mechanisms. A part of the experiment involved intensive measurements at a site in NE Indiana and was designed to provide needed inputs for diagnostic scavenging models. Sequential precipitation chemistry, surface and airborne air chemistry, cloud physics, and meteorological measurements were performed. Although the work presented involves the analysis of only a single precipitation event over a limited geographical area (1000 sq km) the data utilized have considerable uncertainties, and the model contains numerous approximations, it is nevertheless concluded that the ability of the model to reproduce much of the observed precipitation chemistry behavior for the event is quite encouraging. DOE

N83-32196# Massachusetts Inst. of Tech., Cambridge. Dept. of Nutrition and Food Sciences.
HEALTH EFFECTS OF COMBUSTION-GENERATED SOOT AND POLYCYCLIC AROMATIC HYDROCARBONS: HUMAN CELL STUDIES Progress Report, 1977 - 1983
William G. Thilly 1983 82 p refs
(Contract DE-AC02-77EV-04267)
(DE83-004578; DOE/EV-04267/06) Avail: NTIS HC A05/MF A01

Developments in human cell culture mutation essay technology are reviewed. Exhaust particulate extracts were analyzed for mutagenic chemicals. Studies aimed at understanding the biochemical component of the mutagenic process are presented. DOE

N83-32197# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
NEW DEVELOPMENTS IN ACID PRECIPITATION RESEARCH
J. Harte Jun. 1982 15 p refs Presented at the 1st US/China Conf. on Energy, Resources and Environ., Peking, 7-12 Nov. 1982 Sponsored in part by EPRI and EPA
(Contract DE-AC03-76SF-00098)
(DE83-000495; LBL-14887; CONF-821121-1) Avail: NTIS HC A02/MF A01

Recent progress in acid precipitation research is summarized, and major experimental uncertainties are identified. Research tools that are available and those that are needed are described. DOE

N83-32198# Los Alamos Scientific Lab., N. Mex.
COMPARISON OF LATERAL AND VERTICAL DIFFUSION IN SEVERAL VALLEYS
S. Barr 1983 6 p refs Presented at the 6th Am. Meteorol. Soc. Symp. on Turbulence and Diffusion, Boston, 22 Mar. 1983
(Contract W-7405-eng-36)
(DE83-003570; LA-UR-82-3297; CONF-830307-3) Avail: NTIS HC A02/MF A01

The turbulent dispersion of tracers nocturnal in four valleys was examined. Two are reasonably large with greater than 600-m terrain relief and two are well-formed but are shallow and narrow. Both Anderson Creek, California and Parachute Creek, Colorado are large and deep enough to produce a systematic cool air drainage wind regime although the difference in valley shapes makes the structure of that wind field quite different. Parachute Creek is a deep linear valley in which a vigorous down-valley flow develops and exits at the mouth without significant obstruction. Anderson Creek is a three dimensional bowl with a very flat outflow region from which the cool air backs up to form a quasi-stagnant pool 200 to 300 m deep. Inhomogeneous turbulence is a major factor in the transport history of tracers in Anderson Creek. In the

slope-wind position of the basin the plume growth is systematic and about 1.5 to 2 Pasquill-Gifford categories more vigorous than estimated by radiation and windspeed. DOE

N83-32199# Hoechst A.G., Frankfurt am Main (West Germany). Verfahrenstechnik.
HIGH EFFICIENCY OZONE ABSORPTION IN ORGANICALLY POLLUTED WATER (DOWNFLOW COLUMN) Final Report, Oct. 1981
Peter Herbrechtsmeier and Hans Schaefer Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 111 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-056; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 29,50

The development of a process for ozone uptake in water treatment technology is presented. The process fundamentals for ozone absorption in downflow bubble columns were established in a pilot plant. It was shown that the absorption efficiency of downflow bubble columns, in which the gas phase is dispersed in a vertically downflowing liquid stream, considerably exceeds that of conventional absorbers. For multistage absorption, which may be economically desirable, a cascaded countercurrent downflow absorber was developed. Ozone absorption was calculated as a function of process parameters and the costs of absorbing ozone generated from air or oxygen were compared. From experimental results an expression was derived using the similitude theory which permits safe scale-up. Examples of downflow bubble columns in water treatment technology are discussed. Author (ESA)

N83-32200# California Univ., Riverside. Dept. of Plant Pathology.
VIRAL CONTROL OF NUISANCE BLUE-GREEN ALGAE. PART 2: CYANOPHAGE STRAINS, STABILITY STUDIES OF PHAGES AND HOSTS, AND EFFECTS OF ENVIRONMENTAL FACTORS ON PHAGE-HOST INTERACTIONS
P. R. Desjardins and G. B. Olson Sep. 1982 63 p refs
(PB83-178129; W83-02232; OWRT-A-066-CAL(1)) Avail: NTIS HC A04/MF A01 CSCL 06F

The presence of a serologically related strain of AS-1 in the AS cyanophage group that a supposedly new cyanophage was demonstrated. Other studies in the Anabaena cyanophage group determined that the A-4 phage preparation, which was described as a temperate phage was actually a mixture of a lytic and a temperate phage. It was found that Anabaena variabilis Strain S, originally isolated from soil, was a new host for all three phages (A-1, A-4 and AN-10). An antiserum to the LPP-1 cyanophage was prepared utilizing a highly purified preparation of the phage as antigen. The antiserum, which had a relatively high titer was prepared for future detection of the cyanophage in water. Storage survival studies of species of both unicellular and filamentous cyanobacteria demonstrated that some species can survive for several months by simply freezing them at -20C in the culture growth medium. GRA

N83-32201# Maine Univ., Orono. Land and Water Resources Inst.
METAL INPUT AND MOBILIZATION IN 2 ACID-STRESSED LAKE WATERSHEDS IN MAINE M.S. Thesis
Jeffrey S. Kahl Dec. 1982 119 p refs
(PB83-182022; W83-02328; OWRT-A-053-ME(1)) Avail: NTIS HC A06/MF A01 CSCL 08H

Two small lakes in Hancock County (ME), Little Long Pond and Second Pond, were compared for atmospheric deposition, aqueous chemistry, and metal mobilization from sediments. The ponds have similar granitic bedrock, elevation, watershed areas, soil composition, and atmospheric deposition of acids and metals, but they exhibit marked differences in surface water pH. GRA

N83-32202# Geological Survey, University, Ala.
ALABAMA COASTAL REGION ECOLOGICAL CHARACTERIZATION. VOLUME 1: COASTAL BIBLIOGRAPHY
Patrick E. ONeil, Maurice F. Mettee, Elizabeth J. McCullough, Linda A. Acker, and Danny W. Wilson Jun. 1982 412 p Prepared in cooperation with Bureau of Land Management
(Contract DI-14-16-0009-80-1016)
(PB83-180661; FWS/OBS-82/21-Vol-1; LC-82-600554) Avail: NTIS HC A18/MF A01 CSCL 13B

The primary goal of the Coastal Bibliography is to provide a comprehensive data base to potential users of Alabama's coastal areas and resources. The bibliography is comprised of published and unpublished studies that describe the socioeconomic structure and environmental setting of coastal Alabama. Author (GRA)

N83-32203# Acurex Corp., Mountain View, Calif. Energy and Environmental Div.
ANALYSIS OF GEOTHERMAL WASTES FOR HAZARDOUS COMPONENTS Final Report
E. L. Hagmann, D. D. Minicucci, and C. D. Wolbach Apr. 1983 101 p refs
(Contract EPA-68-03-2567)
(PB83-188680; EPA-600/2-83-030) Avail: NTIS HC A06/MF A01 CSCL 08D

Regulations governing the disposal of hazardous wastes led to an assessment for geothermal solid wastes for potentially hazardous properties. Samples were collected from three active geothermal sites in the western United States: The Geysers, Imperial Valley, and northwestrn Nevada. Approximately 20 samples were analyzed for corrosivity, EP toxicity, radioactivity, and bioaccumulation potential. The samples were further characterized by analysis for cations, anions, moisture content, priority pollutants, and additional trace metals in the leachate. In addition, and aqueous extraction was conducted at ambient pH. This study characterized samples from a limited geographical area and results cannot be extrapolated to other geothermal resource areas. Author (GRA)

N83-32204# Massachusetts Univ., Amherst. Water Resources Research Center.
MICROBIOLOGICAL CONTROL OF THE AQUATIC WEED MYRIOPHYLLUM SPP
Haim B. Gunner Jun. 1982 30 p refs
(Contract DI-14-24-0001-9076)
(PB83-181958; PUB-129; W83-02321; OWRT-B-066-MASS(2)) Avail: NTIS HC A03/MF A01 CSCL 06F

Bacteria, fungi and blue green algae normally associated with the phyllosphere of Myriophyllum heterophylum and Myriophyllum spicatum are among the principal decomposers of senescent plants. Stripped of this flora by various sterilizing techniques, the Myriophyllum extended its life by one third. The saprophytic process of decomposition was accelerated to pathogenesis by selecting from the community of microbial decomposers isolates which, when cultured on the appropriate cellulose and pectin media, could be induced to produce enzymes lytic to these tissues and ultimately lethal to the plant. The results suggest that microorganisms native to the Myriophyllum ecosystem, selected for specific plant tissue attack, offer a promising avenue for the biological control of these aquatic nuisance plants. GRA

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N83-32205*# Lamont-Doherty Geological Observatory, Palisades, N. Y.
ACOUSTIC AND GRAVITY WAVES IN THE NEUTRAL ATMOSPHERE AND THE IONOSPHERE, GENERATED BY SEVERE STORMS Final Technical Report
Nambath K. Balachandran May 1983 45 p refs
(Contract NAS8-33378)
(NASA-CR-170834; NAS 1.26:170834) Avail: NTIS

HC A03/MF A01 CSCL 04A

Gravity waves in the neutral atmosphere and their propagation in the ionosphere and the study of infrasonic signals from thunder were investigated. Doppler shifts of the order of 0.1 Hz are determined and they provide high-resolution measurements of the movements in the ionosphere. By using an array of transmitters with different frequencies and at different locations, the horizontal and vertical propagation vectors of disturbances propagating through the ionosphere are determined. Author

N83-32206# University Coll., London (England). Dept. of Physics and Astronomy.

GLOBAL ATMOSPHERIC WAVES: MECHANICAL HEATING OF THE LOWER THERMOSPHERE Final Scientific Report, 1 Jan. - 30 Sep. 1982

G. V. Groves 30 Nov. 1982 32 p refs

(Grant AF-AFOSR-0235-83)

(AD-A127222; AFOSR-82-0052TR) Avail: NTIS HC A03/MF A01 CSCL 04/1

The global mean vertical energy flux of the (1,1,1) mode of atmospheric oscillation is evaluated at 80 km altitude by classical tidal theory for mean January, April, July and October conditions using revised profiles of water vapor and ozone heating. Fluxes calculated for January and July are lower than those for April and October due to seasonal changes in water vapor, solar declination and Sun-Earth distance. Flux values obtained are compared with a previously stated requirement for maintaining the residual thermosphere and are adequate unless damping introduces a factor of more than an order of 10 in magnitude. The relative changes of flux between the above four months are noted to be similar in form to the semi-annual variation of thermospheric air densities.

Author (GRA)

N83-32207# Smithsonian Astrophysical Observatory, Cambridge, Mass.

EMPIRICAL MODELING OF THE GEOMAGNETIC VARIATION IN THE THERMOSPHERE

Jack W. Slowey May 1982 13 p refs

(Contract F19628-81-K-0033)

(AD-A127007) Avail: NTIS HC A02/MF A01 CSCL 04/1

This paper briefly summarizes the development of empirical models of the geomagnetic variation in the thermosphere and exosphere. The earliest models were based exclusively on the results of satellite drag analysis. Although they present a much simplified picture of what is an extremely complex phenomenon, these models are still valid in many applications and remain in wide use. They do, however, leave much to be desired with respect to short-term accuracy and are quite inadequate in many cases in the way in which they depict local conditions. More recent observational data, particularly those from satellite-borne gas analyzers, have resulted in a considerable improvement in empirical models of the geomagnetic variation. One such model and its limitations are described in some detail. Some of the problems relating to the development of improved models in the future are also examined. GRA

N83-32208# SRI International Corp., Menlo Park, Calif.

AURORA-REGION DYNAMICS DETERMINED WITH THE CHATANIKA RADAR Final Scientific Report

Vincent B. Wickwar Nov. 1982 82 p refs

(Contract F49620-78-C-0018; AF Proj. 2310)

(AD-A127042; AFOSR-83-0237TR) Avail: NTIS HC A05/MF A01 CSCL 04/1

An extensive body of data from the Chatanika Incoherent Scatter Radar was acquired between 1971 and 1978, and has been analyzed to learn about the winds in the upper atmosphere in the auroral region. These data have been supplemented by a body of correlative optical data from the Fabry-Perot interferometer operated by the Michigan Auroral Observatory. Most of these data pertain to winds in the lower F region between 180 and 200 km. The wind in the magnetic meridian has been examined, and for the first time, the radar and optical techniques have been compared. Good agreement was found for averaged and for simultaneous observations. When averaged for 24 hours, a large net equatorward wind is found. During the night, this wind increases with magnetic activity. Because few summer and winter observations exist, seasonal variations cannot be derived. But the existing observations differ from those made at the equinoxes in the manner predicted by theory. GRA

N83-32209# Emmanuel Coll., Boston, Mass. Div. of Physics Research.

VARIATION OF EQUATORIAL F-REGION IRREGULARITY PARAMETERS AS A FUNCTION OF SOLAR ACTIVITY Progress Report, 14 Nov. 1981 - 14 Nov. 1982

Eileen MacKenzie and Santimay Basu Hanscom AFB, Mass. AFGL Nov. 1982 81 p refs Sponsored in part by the Defense Nuclear Agency

(Contract F19628-81-K-0011; AF Proj. 4643; AF Proj. 2029)

(AD-A127895; AFGL-TR-82-0369; SR-2) Avail: NTIS HC A05/MF A01 CSCL 04/2

The Air Force Geophysics Laboratory in collaboration with the Geophysical Institute of Peru and the University of Texas at Dallas performed co-ordinated measurements of nighttime F-region irregularities near the magnetic equator during 1975-1979. A variety of techniques, such as ionospheric soundings, scintillation, airglow, VHF radar backscatter and satellite in-situ density probes, were employed to study the F-region irregularities over a wide scale-length range from tens of kilometers to a few meters. The dynamics of the irregularity structures were explored by the Airborne Ionospheric Observatory on the Air Force Geophysics Laboratory as well as by the spaced receiver scintillation measurements performed on the ground. This report compiles some of these measurements with a view to studying the variation of the irregularity characteristics with changes in solar activity that occurred during the campaign periods in the years 1975-1979.

Author (GRA)

N83-32210# Systems Science and Software, La Jolla, Calif.

INTERACTIVE GRAPHICS PACKAGE FOR THE MEGATEK 7250 TERMINAL OF THE SEISMIC ANALYSIS STATION AT THE CENTRE FOR SEISMIC STUDIES Final Report

J. Bernard Minster Apr. 1983 33 p

(Contract MDA903-81-C-0521; ARPA Order 4353; SSS Proj. 11178)

(AD-A127866; SSS-R-83-6089) Avail: NTIS HC A03/MF A01 CSCL 09/5

This document describes five software modules developed for the maps color graphics terminal (MEGATEK 7250) of the Seismic Analysis Station of the Centre for Seismic Studies. These modules permit interactive graphic analysis of: (1) Signal and noise windows selected from a seismogram for purposes of optimal interactive signal-to-noise filtering of raw data; (2) Earthquake fault plane solutions; (3) Three dimensional representations of geographic, tectonic and geophysical information on the surface of the globe; (4) Two dimensional maps in any of eleven different projections; and (5) Seismic rays and associated parameters such as travel-times in a spherically symmetric earth model. Examples of screen displays are provided in this report together with a description of the capabilities offered by each module. GRA

N83-32211# Cooperative Inst. for Research in Environmental Science, Boulder, Colo.

DETERMINISTIC METHODS OF SEISMIC SOURCE IDENTIFICATION Annual Technical Report, 1 Oct. 1981 - 30 Sep. 1982

Charles B. Archambeau Feb. 1983 183 p refs

(Contract F49620-80-C-0018; ARPA Order 3291; AF Proj. 2309)

(AD-A127477; AFOSR-83-0275TR; ATR-4) Avail: NTIS HC A09/MF A01 CSCL 17/10

This report emphasizes results from completed research in seismic wave attenuation. We also describe and illustrate current signal analysis methods using a variety of seismic time series data. The results reported include relative amplitudes, at a large number of standardized seismic stations in the U.S. and Southern Canada, for a large number of explosions and earthquakes observed at three fixed azimuths for many stations. The average

Qa at 1 Hz, for the upper 300 km of the crust-mantle beneath the study area varies from about 65 at Golden, Colorado to about 2000 at Red Lake, Ontario. The mean Qa is 140 for the continental U.S. Other work completed has provided new, high resolution, Q determinations from low order free oscillation excitation, and these results provide strong constraints on lower mantle attenuation. We describe new signal analysis methods devised for use in automatic discrimination and yield estimation in a multivariant approach. In this context we have the current ability to rapidly and automatically obtain spectral magnitudes for a large number of seismic phases, which can be used in both teleseismic and regional discrimination and for yield estimation. GRA

N83-32212# Naval Postgraduate School, Monterey, Calif. Dept. of Meteorology.
TACTICAL APPLICATION OF AN ATMOSPHERIC MIXED-LAYER MODEL M.S. Thesis
Ronald Morton Graves Dec. 1982 59 p refs
(AD-A127527) Avail: NTIS HC A04/MF A01 CSCL 15/3

Modern Naval weapon and sensor systems are strongly influenced by the marine environment. Foremost among the atmospheric effects is ducting of electromagnetic energy by refractive layers in the atmosphere. To assess the effect of ducting on electromagnetic emissions, the Navy developed the Integrated Refractive Effects Prediction System (IREPS). Research at Naval Postgraduate School (NPS) has led to development of a state-of-the-art model which can be used to predict changes to the refractive profile of the lower atmosphere. The model uses radiosonde data and surface meteorological observations to predict changes in refractive conditions and low level cloud/fog formation over 18 to 30 hour periods. The model shows some skill in forecasting duct regions when subsidence rates can be specified to within +/-.0015 m/s. This thesis shows the applicability of the NPS marine atmospheric mixed layer model to fleet tactics. Atmospheric refractive effects on specific emitters can be predicted when model predictions are used in conjunction with IREPS.
Author (GRA)

N83-32213# Air Force Geophysics Lab., Hanscom AFB, Mass.
ROCKETBORNE MEASUREMENTS OF OPTICAL EMISSIONS FROM THE AURORAL E-LAYER Final Scientific Report
R. A. VanTassel 16 Nov. 1982 60 p refs
(AF Proj. 6690)
(AD-A127517; AFGL-TR-82-0354; AFGL-ERP-807) Avail: NTIS HC A04/MF A01 CSCL 14/2

The overall objective of the AFGL Auroral-E Program is to develop a system to specify the electron density in the auroral E-layer by remote sensing of optical emissions. The first step in meeting this objective was a careful input-output experiment conducted in Alaska during March 1981. This experiment included satellite measurements of the source particle stream; rocket measurements of the optical emissions, electron and proton fluxes and electron, neutral and ion densities, neutral winds and electromagnetic fields; airborne measurements to provide data to assess the auroral and ionospheric conditions prior to and during launch; and incoherent scatter radar measurements to provide neutral wind, electric field and electron density data. These data will be used to establish a quantitative relationship among the precipitating particles, the resulting electron density profiles and the optical emissions from several species in the continuous or diffuse aurora. This report gives the results of the rocket-borne filter photometer experiment. Author (GRA)

N83-32214# Utah State Univ., Logan. Center for Atmospheric and Space Sciences.
ATMOSPHERIC TEMPERATURE PROFILES FROM EARTH LIMB INFRARED MEASUREMENTS Final Report
R. D. Harris 15 Dec. 1982 32 p refs
(Grant AF-AFOSR-0153-82; AF Proj. 2310)
(AD-A127536; AFOSR-83-0281TR) Avail: NTIS HC A03/MF A01 CSCL 04/1

This report describes the work accomplished on the retrieval of stratospheric temperature and density profiles from remote earth limb-view infrared radiation measurements. Temperature or density can be retrieved in a routine manner. A model based on two rotational lines of C02 was developed to retrieve simultaneously both temperature and density. This model is running on a CRAY-1 Computer but needs additional verification. An investigation of alternative methods to calculate infrared transmittance has showed that an interpolation scheme does not work for limb-view geometrics with a subsequent potential savings in computer time of one thousand or better. Though the concept has been proved, the ultimate accuracy of this method has still to be evaluated.
GRA

N83-32215# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Seismology.
SEISMOGRAPHIC NETWORKS: PROBLEMS AND OUTLOOK FOR THE 1980'S
Thomas V. McEvilly, C. Allin Cornell, Paul C. Jennings, Hiroo Kanamori, Karen C. McNally, Peter H. Molnar, Paul G. Richards, and Robert B. Smith 1983 78 p refs
(AD-A128032) Avail: NTIS HC A05/MF A01 CSCL 05/2

The workshop on Seismographic Networks was convened to consider the problems confronting network seismology and to provide scientific, technical, and management guidance to federal agencies, primarily regarding the operation of global, national, and regional seismographic networks. It was prompted by a number of related questions brought in recent months to the Committee on Seismology. This report is the result of that workshop. GRA

N83-32216# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
A COMPARISON OF THE MSIS AND JACCHIA-70 MODELS WITH MEASURED ATMOSPHERIC DENSITY DATA IN THE 120 TO 200 km ALTITUDE RANGE
A. B. Prag 20 Apr. 1983 149 p refs
(Contract F04701-82-C-0083)
(AD-A128005; SD-TR-83-25; TR-0083(3940-04)-1) Avail: NTIS HC A07/MF A01 CSCL 04/1

The MSIS and Jacchia-70 (J70) models have been evaluated at each of the nearly 55,000 points for which we have measurements of the atmospheric density between 120 and 200 km. The density measurements were made by nine different instruments of five types (ion gauge, capacitance manometer, mass spectrometer, calorimeter, and accelerometer) flown of five satellites during the 1974-1977 solar minimum. Except for the solar flux, all the parameters used in the models (geomagnetic activity, altitude, latitude, local time, season, etc.) were well represented. The density measurements at any one altitude were found to be consistent with a lognormal distribution; that is, the fractional variations in the density were normally distributed, rather than the variations themselves. If a model correctly predicted the average variation in density, the log of the ratio of the measurements to the predictions should be normally distributed with skewness of 0.0 and kurtosis of 3.0. In fact, the skewness when the J70 model was used was -0.10 and the kurtosis was 3.51. For the MSIS model, the corresponding numbers were -0.06 and 4.42. GRA

N83-32217# Notre Dame Univ., Ind. Dept. of Civil Engineering.
TENSION CUTOFF AND PARAMETER IDENTIFICATION FOR THE VISCOPLASTIC CAP MODEL Final Report, Dec. 1981 - Feb. 1983
Michael G. Katona Pt. Hueneme, Calif. NCEL Apr. 1983 83 p refs
(Contract N62474-82-C-8270; ZR000001180)
(AD-A128304; NCEL-CR-83.023) Avail: NTIS HC A05/MF A01 CSCL 08/11

A viscoplastic formulation based on Perzyna's elastic/viscoplastic theory and the Sandler and Rubin CAP75 plasticity model was extended to include a tension cutoff mechanism. The mechanism employs separate fluidity parameters for the dilatational and deviatoric stress releases. A parameter identification study was performed to determine the sensitivity of the parameters and means of determining them from experimental data. Author (GRA)

N83-32218# Purdue Univ., Lafayette, Ind. Dept. of Geosciences.
SYNTHETIC SEISMOGRAM MODELING Final Technical Report, 1 Dec. 1980 - 28 Feb. 1982
Lawrence W. Braile 15 Nov. 1982 103 p refs
(Contract N00014-75-C-0972)
(AD-A128305; TR-1-82-ONR) Avail: NTIS HC A06/MF A01 CSCL 08/1

Seismic modeling techniques for one and two dimensional velocity models have been developed, tested and applied to analysis of observed seismic refraction and reflection data for the continental crust. The reflectivity method for one dimensional models has proven to be an efficient and powerful method for interpretation of the amplitude and waveform of seismic record sections. The amplitude and waveform characteristics are shown to be important to interpretation of fine structure of velocity depth profiles. Applications to modeling of a variety of seismic phases are given. Two dimensional modeling techniques utilizing ray-trace travel-time calculations and finite-difference synthetic seismogram calculations were developed. The ray-tracing methods are capable of accurate travel-time applications but require modification for amplitude analysis. The finite-difference method is a powerful technique capable of modeling seismic data for complex geologic structures for body and surface waves. Model studies for simple one and two dimensional velocity structures illustrate seismic wave propagation including complex amplitude and waveform characteristics due to model complexity. The principal limitation of the finite-difference technique is the large amount of computer time and storage required. GRA

N83-32219# Mine Subsidence Engineering Co., Morrison, Colo.
CHARACTERIZATION OF SUBSIDENCE OVER MULTIPLE-LIFT LONGWALL PANELS Final Technical Report
Donald W. Gentry and Collin L. Stewart Sep. 1982 150 p refs
(Contract DE-AC22-80PC-30118)
(DE83-001856; DOE/PC-30118/T4) Avail: NTIS HC A07/MF A01

This report presents the methodology and procedures utilized in installing and removing a surface subsidence monitoring net in remote, rugged, alpine terrain. Work on this project was performed by Mine Subsidence Engineering Company (MSE) and funded by the Department of Energy (DOE). The original contract (73-month duration) called for the installation and monitoring of a surface subsidence net suitable for the characterization of subsidence over multiple lift longwall panels. However, because of DOE contract modifications, actual project work involved only the installation, baseline surveys, and subsequent removal of the subsidence monitoring net during the 24-month contract period. These activities are described herein, as well as the required permitting process. DOE

N83-32220# SRI International Corp., Menlo Park, Calif.
THE MITHRAS: A PROGRAM OF SIMULTANEOUS RADAR OBSERVATIONS OF THE HIGH-LATITUDE AURORAL ZONE Final Scientific Report
O. DeLaBeaujardiere, M. J. Baron, V. B. Wickwar, C. Senior, and J. V. Evans Nov. 1982 85 p refs
(Contract F49620-81-C-0042; AF Proj. 2310)
(AD-A127016; AFOSR-83-0238TR) Avail: NTIS HC A05/MF A01 CSCL 04/1

An intensive campaign of coordinated incoherent-scatter radar experiments took place in 1981-1982. It was planned to take advantage of the short period during which three incoherent-scatter radars could probe the auroral zone simultaneously. The three incoherent-scatter radars that participated in the MITHRAS experiments were Chatanika, Millstone-Hill, and EISCAT. Collaborative studies were undertaken using data from the DE spacecraft and the stare radar. There were three main types of MITHRAS experiments, each with a different scientific purpose. MITHRAS 1 was aimed at large latitudinal coverage of F-region drifts, electron-densities and temperatures. MITHRAS 2 was designed for very good height and time resolution. MITHRAS 3 was intermediate between the other two modes. It provided both E- and F-region coverage over several degrees in latitude. Under the MITHRAS project, substantial changes and additions were made to the software and hardware systems at Millstone and Chatanika. Thirty-three MITHRAS experiments were performed. Most of the data have been reduced. The analysis and interpretation of the date are well underway. GRA

N83-32221# California Univ., Livermore. Lawrence Livermore Lab.
ACCURATE, PRACTICAL SIMULATION OF SATELLITE INFRARED RADIOMETER SPECTRAL DATA Ph.D. Thesis
Thomas Joseph Sullivan Sep. 1982 145 p refs
(Contract W-7405-eng-48)
(DE83-002506; UCRL-53346) Avail: NTIS HC A07/MF A01

This study's purpose is to determine whether a relatively simple random band model formulation of atmospheric radiation transfer in the infrared region can provide valid simulations of narrow interval satellite-borne infrared sounder system data. Detailed ozonesondes provide the pertinent atmospheric information and sets of calibrated satellite measurements provide the validation. High resolution line-by-line model calculations are included to complete the evaluation. DOE

N83-32222# Geological Survey, Reston, Va.
EVALUATION OF POTENTIAL SURFACE FAULTING AND OTHER TETONIC DEFORMATION
M. G. Bonilla Oct. 1982 65 p refs
(DE83-900503; NUREG/CR-2991) Avail: NTIS HC A04/MF A01; Also Avail: SOD $5.00

This report summarizes and provides references to much of what is known about tectonic deformation associated with earthquakes and describes current approaches and procedures for evaluating the hazards of surface faulting and other earthquake-related tectonic deformation. Emphasis is placed on surface faulting because it is the more significant hazard for most construction. DOE

N83-32223# Geological Survey, Champaign, Ill.
PALEOZOIC GEOLOGY OF THE NEW MADRID AREA
H. R. Schwalb Sep. 1982 69 p refs
(DE83-900300; NUREG/CR-2909) Avail: NTIS HC A04/MF A01; Also Avail: SOD $5.00

Thick sections of sedimentary rocks occupy two grabens, the Reelfoot Rift and the Rough Creek Garben. Early sediments of Middle Cambrian and sub-Mt. Simon (Lamotte) deposition are found in the grabens, but do not crop out in the area. Growth faulting continued to deepen the Rough Creek Garben and possibly the Reelfoot Rift during much of the Paleozoic interval. Renewed tectonic activity, probably occurring during the Mesozoic Era, uplifted the Pascola Arch near the center of the Reelfoot Rift and also renewed uplift of many structural features and fault zones, some of which were displaced in a direction opposite to earlier movements. Erosion then removed thousands of feet of sediment from the area, and beveled the Pascola Arch. Igneous plutons were injected into the Precambrian basement rocks and some penetrated into the sedimentary section and formed dikes and sills. DOE

N83-32224# California Univ., Livermore. Lawrence Livermore Lab.
AIRBORNE-TEMPERATURE-SURVEY MAPS OF HEAT-FLOW ANOMALIES FOR EXPLORATION GEOLOGY
Nancy Kerr DelGrande 9 Jul. 1982 4 p Presented at the 2nd Thematic Conf. Remote Sensing for Exploration Geology, Fort Worth, Tex., 6-10 Dec. 1982
(Contract W-7405-eng-48)
(DE82-019111; UCRL-87802; CONF-821204-1) Avail: NTIS HC A02/MF A01

Airborne temperature surveys were used to depict the small surface temperature differences related to heat flow anomalies. Zones with conductive heat flow differences of 45 + or - 16 micro cal/ sq cm had predawn surface temperature differences of 1.4 + or - 0.3 C. Airborne temperature surveys were coordinated with

field temperature surveys at the site of a known geothermal resource area. The airborne temperature surveys recorded redundant, predawn temperatures at two wavelengths and at two elevations. Overall temperature corrections were determined by calibrating dry soil surface temperatures with thermistor probes. The probes measured air and soil temperatures within 2 cm of the surface, every twenty minutes, during the survey overflights. DOE

N83-32225# Rockwell International Corp., Richland, Wash. Energy Systems Group.
GEOPHYSICAL INVESTIGATION OF EASTERN YAKIMA RIDGE, SOUTH-CENTRAL WASHINGTON M.S. Thesis
Michael Patrick Cochran 1982 143 p refs
(Contract DE-AC06-77RL-01030)
(DE83-002618; RHO-BW-SA-214-P) Avail: NTIS HC A07/MF A01

This study determined the structural relationship between the easternmost exposures of Yakima Ridge and its subsurface extension into the central Pasco Basin. Yakima Ridge is the topographic expression of one of the Yakima Folds that plunge into the basin from the west. Knowledge of this relationship will contribute to an understanding of the processes that may influence ground water movement within the Columbia River basalts. DOE

N83-32226# Geological Survey, Iowa City, Iowa.
REGIONAL TECTONICS AND SEISMICITY OF SOUTHWESTERN IOWA Final Report, 1978 - 1982
O. J. VanEck, R. R. Anderson, C. L. Cumerlato, T. H. Faller, and J. D. Logel Nov. 1982 68 p refs
(DE83-900978; NUREG/CR-3021) Avail: NTIS HC A04/MF A01; Also Avail: SOD $5.00

Utilizing gravity and aeromagnetic data, a series of geophysical profiles were constructed across the Midcontinent Geophysical Anomaly (MGA) which extends across the southwestern Iowa study area. By combining the information provided by modeling techniques with limited deep well data, a map of the Precambrian basement was generated. The interpretation that emerged includes a central horst of igneous intrusives and extrusives, extensively faulted, and overlain in some areas by Keweenawan clastics. The horst is flanked by a series of high angle faults, with the majority of the faults displaying vertical displacement along two structural zones, the Thurman-Redfield Structural Zone, along with flanks the northwestern boundary. The total vertical displacement present along these fault zones is estimated to be a maximum of 9 km. Two clastic-filled basins flank the horst, one of which has an interpreted depth of 10 km. DOE

N83-32227# Institute of Oceanographic Sciences, Wormley (England). Natural Enviroment Research Council.
INTRAPLATE SEISMICITY AND SEISMIC RISK IN THE ATLANTIC OCEAN BASED ON TELESEISMICALLY OBSERVED EARTHQUAKES
R. C. Lilwall 1982 44 p refs Sponsored by Ministry of the Environment
(IOS-136) Avail: NTIS HC A03/MF A01

The seismic risk is studied in order to assess the suitability of the deep ocean floor for the disposal of high level radioactive waste. Records of large earthquakes at land stations for the past 70 years are used to assess the levels of seismicity in the regions of the Atlantic ocean situated away from the recognized active zones. Uncertainties in source distribution and ground motion attenuation result in a wide variation in risk estimates. Taking 0.1 g peak acceleration as a conservative value at which liquefaction and slope instability become possible, these uncertainties result in the range 2000 to 10,000 years for the return period. Author (ESA)

N83-32228# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Earthquake Engineering Research.
EARTHQUAKE ENGINEERING RESEARCH, 1982: OVERVIEW AND RECOMMENDATIONS
1982 94 p
(Grant NSF CEE-81-11095)
(PB83-176024; CETS-CEER-001A) Avail: NTIS HC A05/MF A01 CSCL 08K

The Committee on earthquake engineering research addressed two questions: what progress has research produced in earthquake engineering and which elements of the problem should future earthquake engineering pursue. Applications of past research, assessment of earthquake hazard, earthquake ground motion, soil mechanics and earth structures, analytical and experimental structural dynamics, earthquake design of structures, seismic interaction of structures and fluids, social and economic aspects, earthquake engineering education, research in Japan are examined. GRA

N83-32229# National Academy of Sciences - National Research Council, Arlington, Va. Committee on Earthquake Engineering Research.
EARTHQUAKE ENGINEERING RESEARCH: 1982
1982 281 p refs
(Grant NSF CEE-81-11095)
(PB83-176032; CETS-Ceer-001B) Avail: NTIS HC A13/MF A01 CSCL 08K

The Committee on Earthquake Engineering Research addressed two questions: What progress has research produced in earthquake engineering and which elements of the problem should future earthquake engineering pursue. It examined and reported in separate chapters of the report: Applications of Past Research, Assessment of Earthquake Hazard, Earthquake Ground Motion, Soil Mechanics and Earth Structures, Analytical and Experimental Structural Dynamics, Earthquake Design of Structures, Seismic Interaction of Structures and Fluids, Social and Economic Aspects, Earthquake Engineering Education, Research in Japan. Author (GRA)

N83-32230# CER Corp., Las Vegas, Nev.
GEOLOGY AND ENGINEERING CHARACTERISTICS OF SELECTED LOW-PERMEABILITY GAS SANDS: A SURVEY Final Report
Robert J. Finly and Stephen W. Speer Jun. 1982 398 p refs Prepared in cooperation with Texas Univ., Austin Sponsored by GRI
(PB83-195099; GRI-82/0028) Avail: NTIS HC A17/MF A01 CSCL 08G

Blanket-geometry sands have been deposited by different depositional systems than lenticular sands, with resulting differences in external and internal reservoir geometry and in the techniques necessary to find, develop, and produce the tight, blanket-geometry gas sand. This survey was conducted with emphasis on clastic depositional systems and the expected transferability of results betweeen stratigraphic units. The expected transferability has been termed extrapolation potential. Information was compiled for stratigraphic units in 16 sedimentary basins regarding the general attributes, economic factors, geologic parameters of the basin, geologic and engineering parameters of the unit itself, and operating conditions applicable to selected blanket-geometry tight gas sands. GRA

N83-32231# National Bureau of Standards, Washington, D.C.
SELF-STUDY MANUAL ON OPTICAL RADIATION MEASUREMENTS. PART 3. APPLICATIONS, CHAPTER 1. MEASUREMENT OF SOLAR TERRESTRIAL SPECTRAL IRRADIANCE IN THE OZONE CUT-OFF REGION Final Report
Henry J. Kostkowski, Robert D. Saunders, John F. Ward, Charles H. Popenoe, and A. E. S. Green Dec. 1982 94 p refs
(PB83-184382; NBS-TN-910-5) Avail: NTIS HC A05/MF A01 CSCL 04A

This is the first chapter in Part 2 (Applications) of this Manual. Material developed in earlier chapters is used to perform state-of-the-art measurements in Gainesville, Florida, of solar terrestrial spectral irradiance between 290 (nm) and 340 (nm). The measurement equation is used to design the experiment and to address the effects of polarization, non-linearity, spectral scattering,

distortion, slit-scattering function, spectral irradiance calibration, and wavelength calibration. Estimates are made of the uncertainties associated with all these factors. The total uncertainty is estimated to be about 10 percent. An appendix includes details for computing the solar terrestrial spectral irradiance between 280 and 310 (nm). Suggestions are made for reducing the uncertainty by about one third and for further research in UV solar terrestrial measurements. GRA

N83-31630# Joint Publications Research Service, Arlington, Va.
SPACE SURVEY TECHNIQUES BENEFIT GEOLOGY
Geology V. Volkov *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 75-77 Transl. into ENGLISH from Izvestiya (Moscow), 15 Jan. 1983 p 3 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

N83-32092# Texas Univ., Austin. Dept. of Engineering Mechanics.
DIGITAL SYNTHESIS OF RESPONSE-DESIGN SPECTRUM COMPATIBLE EARTHQUAKE RECORDS FOR DYNAMIC ANALYSES
P. T. D. Spanos *In* Shock and Vibration Information Center The Shock and Vibration Digest, V. 15, No. 3 Mar. 1983 p 21-30 refs (For primary document see N83-32089 20-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 08/11

N83-32122# Joint Publications Research Service, Arlington, Va.
DRILLING AT ACCESSES TO EARTH'S MANTLE
L. N. Shadrin *In its* USSR Rept.: Earth Sci., No. 26 (JPRS-83622) 7 Jun. 1983 p 39-52 Transl. into ENGLISH from Priroda (Moscow), no. 1, Jan. 1983 p 12-22 (For primary document see N83-32121 20-42)
Avail: NTIS HC A05

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N83-32232* National Aeronautics and Space Administration. Pasadena Office, Calif.
CLOUD COVER SENSOR Patent
Eric G. Laue, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 26 Oct. 1982 5 p Filed 27 Jun. 1980 Supersedes N80-26992 (18 - 17, p 2318)
(NASA-Case-NPO-14936-1; US-Patent-4,355,896;
US-Patent-Appl-SN-163837; US-Patent-Class-356-222;
US-Patent-Class-250-203R) Avail: US Patent and Trademark Office CSCL 04B

An apparatus is described which provides a numerical indication of the cloudiness at a particular time of a day. The apparatus includes a frame holding several light sensors such as photovoltaic cells, with a direct sensor mounted to directly face the Sun and indirect sensors mounted to face different portions of the sky not containing the Sun. A light shield shields the direct sensor from most of the sky except a small portion containing the Sun, and also shields each of the indirect sensors from direct sunlight. The relative values of the outputs from the direct and indirect sensors, enables the generation of a numerical indication of the degree of cloudiness at a particular time of day.
Official Gazette of the U.S. Patent and Trademark Office

N83-32233# Science Applications, Inc., Monterey, Calif.
TROPICAL CYCLONE WIND PROBABILITY FORECASTING FOR THE NORTH INDIAN OCEAN (WINDPIO) Final Report
Jery D. Jarrell Mar. 1983 22 p refs
(Contract N00228-81-C-H361)
(AD-A127130; NEPRF-CR-83-03) Avail: NTIS HC A02/MF A01 CSCL 04/2

The development of a model to estimate 30 kt and 50 kt wind probabilities from tropical cyclone forecasts in the North Indian Ocean is described. The model is based on position forecast errors, which are used to determine the probability of a cyclone occupying a particular geographical position, and on wind profile errors. Wind profile errors consist of errors in the forecast maximum and errors in the forecast radius of 30 kt and 50 kt winds. The profile errors are used to estimate the probability of 30 kt and 50 kt winds occurring at a point, given that the tropical cyclone occupies a particular position. These position and wind probability elements are combined by using an assumption of independence which was supported by correlation coefficients in an earlier work. The present model, which includes features of the earlier strike probability model and an Atlantic Ocean wind probability model, is tested on independent data. Test results illustrate good agreement between forecast probability and the frequency of occurrence of 30 kt and 50 kt winds. Author (GRA)

N83-32234# Dayton Univ., Ohio.
A MODEL FOR THE SURFACE WIND FIELD IN COMPLEX TERRAIN Final Report
Patrick A. Haines, John L. Keller, Charles D. MacArthur, and Jerry G. Jensen White Sands Missile Range, N. Mex. Atmospheric Sciences Lab. Jan. 1983 81 p refs
(Contract DAAD07-80-D-0206)
(AD-A127030; ERADCOM/ASL-CR-83-0206-1) Avail: NTIS HC A05/MF A01 CSCL 04/2

A model for calculating terrain-influenced surface (6 meter) wind fields is described. The model determines locally generated slope and valley winds as well as mechanically affected changes in the general wind due to sheltering, diverting, ridge enhancement, and separated flow. A procedure is also given for the generation of an optimal computation grid on which the wind field is computed. Winds calculated on this optimal, and usually uneven grid, may then be interpolated by the model to a uniform grid specified by the user. The model is designed to compute wind fields without the need for surface observations. Analysis areas are arbitrary, ranging from as small as 1 sq km to as large as 50 sq km. GRA

N83-32235# Naval Oceanography Command Center/Joint Typhoon Warning Center, FPO San Francisco, Calif.
PREDICTING THE ACCELERATION OF NORTHWARD-MOVING TROPICAL CYCLONES USING UPPER-TROPOSPHERIC WINDS
Robert C. Weir Dec. 1982 43 p refs
(AD-A127446; NOCC/JTWC-TN-82-2) Avail: NTIS HC A03/MF A01 CSCL 04/2

Inconsistent forecasting of the acceleration of northward-moving tropical cyclones entering the domain of the mid-latitude westerlies has been a longstanding weakness in tropical cyclone forecasting. The tracks of tropical cyclones traversing a relatively high-density data area of the western North Pacific have been analyzed to verify the acceleration phenomenon and to correlate the movement with features of the upper-tropospheric wind field. The resultant forecast technique is described and the results obtained with its use during the 1982 tropical cyclone season are presented. GRA

N83-32236# Illinois State Water Survey, Urbana. Meteorology Sect.
LOW LEVEL CONVERGENCE AND THE PREDICTION OF CONVECTIVE PRECIPITATION Final Report, 1 May 1978 - 30 Jun. 1981
Bernice Ackerman, ed. Dec. 1982 136 p refs
(Contract MIPR-ARO-21-78; Grant NSF ATM-78-08865)
(AD-A127673; ARO-15529.10-GS; SWS-CR-316) Avail: NTIS HC A07/MF A01 CSCL 04/2

Researchers at the University of Virginia, the Office of Weather Research and Modification (OWRM) of NOAA (formerly the cumulus group of Hurricane and Experimental Meteorological Laboratory), and the Illinois State Water Survey, have engaged in a collaborative effort to study the relationship between surface convergence and subsequent precipitation from convective clouds in both subtropical marine and mid-latitude continental climates. The overall goal of

the research was to increase the understanding of the dynamics involved in the development of convective clouds and in cloud interactions on the mesoscale. More specifically, the research focused on the role of low level and surface convergence in the evolution of precipitating convective systems and on developing methods by which this increased knowledge could be used for nowcasting convective precipitation. The research studies were based both on existing data sets from Florida and the Midwest and on measurements made in a special field project carried out during the second year of the three year project. Author (GRA)

N83-32237# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.
MESOSCALE CLIMATOLOGY OF CLOUD COVER OVER KOREA AND GERMANY Final Scientific Report
Charles F. Burger and Irving I. Gringorten 19 Nov. 1982 130 p refs
(AF Proj. 6670)
(AD-A127521; AFGL-TR-82-0351; AFGL-AFSG-440) Avail: NTIS HC A07/MF A01 CSCL 04/2

The results are presented of a study of cloud cover over Korea and Germany, to obtain mesoscale cloud climatologies in data-void regions. Two methods for modeling the climatological frequency distribution of total cloud cover are discussed, a simple linear regression called the Simplified Linear Model (SLM), and Gringorten's Model B. Both models fit the data well. Map analyses of the parameters from both models show definite mesoscale geographic patterns in Korea. This may enable the development of methods for obtaining the cloud cover frequency at locations where there are no data. More data are needed to complete such a study. Similar analyses in Germany reveal no obvious geographic relationships for the SLM parameters, and almost no gradient for Model B parameters. The advantage of both models over others is their realistic values for clear and overcast cases. Specific advantages are, for the SLM, its simplicity, and for Model B, its ability to model cloud covers for areas different from that of observer's field of view. Author (GRA)

N83-32238# Air Force Geophysics Lab., Hanscom AFB, Mass.
AN ASSESSMENT OF THE AN/GMQ-13 CLOUD HEIGHT SET CAPABILITY TO MEET AWS REQUIREMENTS Final Scientific Report
Frederick J. Brousaides 12 Dec. 1982 26 p refs
(AF Proj. 2688)
(AD-A127516; AFGL-TR-82-0382; AFGL-ERP-812) Avail: NTIS HC A03/MF A01 CSCL 04/2

The capability and performance of the AN/GMQ-13 Cloud Height Set, commonly referred to as the Rotating Beam Ceilometer (RBC), was reviewed. Included in the study is an assessment of its ability to meet specific requirements for automting the measurement of cloud field properties, that is, layering and cloud cover, through the application of the hierarchical clustering technique. It is concluded that a single RBC system cannot meet current stated requirements for cloud height measurement. An RBC with a 1600 ft baseline can meet the high altitude requirement but has difficulty with low ceilings that are also associated with conditions of restricted visibility. An RBC with a 400-ft baseline does well at low altitudes but is totally inadequate at high altitudes. An obvious compromise would be the deployment of two RBCS, or one projector and two receivers. The hierarchical clustering technique for the determination of cloud field properties was previously demonstrated in AFGL and AWS field tests. The resolution and accuracy to be obtained is a function of the number of ceilometers available, their orientation, and time averaging considerations. Author (GRA)

N83-32239# Naval Postgraduate School, Monterey, Calif. Dept. of Meteorology.
WORKSHOP FOR THE WINTER MONSOON EXPERIMENT
Chih-Pei Chang, ed. and Peter J. Webster, ed. Mar. 1983 57 p refs Workshop held at Monterey, 14-15 Jun. 1982 Sponsored in part by the National Academy of Sciences
(Grant NSF ATM-80-13153)
(AD-A127989; NPS63-83-002) Avail: NTIS HC A04/MF A01 CSCL 04/2

Since the field phase of the Winter Monsoon Experiment (Winter MONEX: December 1978 - March 1979), considerable effort has been expended in collecting and checking data in order to create a consistent data set for research purposes. With this task completed research has been undertaken utilizing the data set in diagnostic studies and in parallel theoretical and modelling endeavors. Preliminary results have been presented at two international conferences. The following pages constitute a report on the Winter Monsoon Experiment workshop held at the Naval Postgraduate School, Monterey, California, June 14-15, 1982.GRA

N83-32240# Weather Squadron (31st), APO New York, N.Y. Detachment 25.
TERMINAL FORECAST REFERENCE NOTEBOOK FOR RAMSTEIN AB, GERMANY Final Report
1 Oct. 1982 39 p refs
(AD-A128319) Avail: NTIS HC A03/MF A01 CSCL 04/2

The climate and its effect on flying operations at Ramstein Air Base is described. Meteorological parameters such as visibility, cloud height, wind profiles and ceilings are discussed. Location, terrain analysis and topography are also described. B.W.

N83-32241# Naval Postgraduate School, Monterey, Calif. Dept. of Meteorology.
FURTHER STUDIES IN THE APPLICATION OF DYNAMIC INITIALIZATION FOR GLOBAL PREDICTION MODELS WITH SPECIAL ATTENTION TO EQUATORIAL WAVES
F. J. Winninghoff and R. T. Williams Mar. 1983 44 p refs
(AD-A128511; NPS63-83-001) Avail: NTIS HC A03/MF A01 CSCL 04/2

A dynamical initialization procedure incorporating friction and simulated heating has been applied with the use of a global barotropic primitive equation model in spherical coordinates to the problem of initialization of small scale motions in the fluid. Special emphasis is given to Kelvin and Rossby-gravity waves centered on the equator. These types of waves cause considerable difficulty if any type of quasigeostrophic of balanced type of initialization is used. The results are very encouraging in the sense that if information concerning the wind fields associated with such waves is available the mass field can be recaptured quite well even if no information beyond its mean value is available. For operational purposes some combination of this method with present advanced balancing methods may be indicated. GRA

N83-32242# California Univ., Livermore. Lawrence Livermore Lab.
A SCAVENGING MODEL FOR STRATIFIED PRECIPITATION
Charles R. Molenkamp Nov. 1982 11 p refs Presented at the 4th Intern. Conf. on Precipitation Scavenging, Dry Deposition and Resuspension, Santa Monica, Calif., 29 Nov. - Dec. 1982
(Contract W-7405-eng-48)
(DE83-003374; UCRL-87551; CONF-821136-1) Avail: NTIS HC A02/MF A01

An enhanced capability of simulating precipitation scavening of pollutant particles by stratified precipitation for numerical models of medium- to long-range transport, diffusion and deposition is given. The long-range transport model (2BPUFF) is a two dimensional axisymmetric Lagrangian model using scale-dependent diffusion with transport along a trajectory deduced from measured winds. The medium-range transport model is an adaptation of a three dimensional particle-in-cell code which uses measured winds that were interpolated mass-consistently to a grid. Both of these models currently have crude capabilities to include precipitation scavenging. DOE

N83-32243# Sandia Labs., Albuquerque, N. Mex.
X-RAY MEASUREMENTS OF WATER-FOG DENSITY
Allen L. Camp Oct. 1982 38 p refs
(Contract DE-AC04-76DP-00789)
(DE83-005139; NUREG/CR-2767; SAND-82-1292) Avail: NTIS HC A03/MF A01; also available HC SOD

Water-fog densities were measured in a laboratory experiment using X-ray diagnostics. Fog densities were measured, varying the flow rate, nozzle type, nozzle configuration, nozzle height above the X-ray beam, and water surface tension. Suspended water volume fractions between 0.0008 and 0.0074 percent were measured. The fog density increases approximately as the square foot of the flow rate; the other parameters had little effect on the density. DOE

N83-32244# Oak Ridge National Lab., Tenn. Environmental Sciences Div.

CLOUD WATER: AN IMPORTANT VECTOR OF ATMOSPHERIC DEPOSITION

Gary M. Lovett and William A. Reiners (Dartmouth Coll., Hanover, N.H.) 1982 9 p refs Presented at the 4th Intern. Conf. on Precipitation Scavenging, Dry Deposition and Resuspension, Santa Monica, Calif., 29 Nov. 1982

(Contract W-7405-eng-26)

(DE83-004646; CONF-821136-6) Avail: NTIS HC A02/MF A01

Because advective fogs are wind-borne, they not only wet vegetation, but can deliver large amounts of water and dissolved ions to the earth's surface. Previous efforts to measure cloud and fog water deposition are reviewed, and current studies are summarized. To evaluate the importance of impaction, sedimentation, and evaporation to the process of cloud water deposition, these physical processes were modeled for the subalpine balsam fir (Abies balsamea) forests of the northern Appalachians. The model was tested in several ways. Results indicate that for a canopy of given structure, the primary factors influencing the gross cloud droplet deposition are wind speed, cloud liquid water content, and cloud droplet size distribution. Rates of ionic deposition during cloud events are reported. DOE

N83-32245# Brookhaven National Lab., Upton, N. Y.

DIFFERENTIAL RAIN AND SNOW SCAVENGING EFFICIENCY IMPLIED BY IONIC CONCENTRATION DIFFERENCES

G. S. Raynor and J. V. Hayes Nov. 1982 17 p refs Presented at 4th Intern. Conf. on Precipitation Scavenging, Dry Deposition and Resuspension, Santa Monica, Calif., 29 Nov. 1982

(Contract DE-AC02-76CH-00016)

(DE83-006304; BNL-32398; CONF-821136-16) Avail: NTIS HC A02/MF A01

Data from hourly, sequential precipitation samples taken during five winters at Brookhaven National Laboratory were analyzed to investigate differences in ionic composition between rain and snow. Concentrations of all ions measured hydrogen, sulfate, nitrate plus nitrite, ammonium, chloride and sodium, were significantly higher in melted snow than in rain. Nitrate plus nitrite averaged nearly five times and ammonium nearly three times greater in snow than in rain. Other concentrations differed by less than a factor of two. Synoptic and meteorological conditions were similar in rain and snow cases except for temperature and local wind direction. Surface temperatures during rain were extrapolated upwards assuming a moist adiabatic lapse rate to determine the probable height of the freezing level. Results suggest that all winter rain probably starts as frozen precipitation. An inverse correlation was found between concentration and precipitation fall speed as inferred from precipitation rate and type. DOE

N83-32246# California Univ., Livermore. Lawrence Livermore Lab.

TIMING AND CONTROL MONITOR SYSTEM REQUIREMENTS

W. Brough, J. Brandt, B. Browning, B. Hensiek, and B. Ritenour 15 Nov. 1982 74 p refs

(DE83-005343; UCID-19642) Avail: NTIS HC A04/MF A01

The functional, operational, system performance, reliability, interfacing, environmental, and packaging, and testing requirements for the Timing and Control Monitoring Upgrade Project at the Nevada Test Site are discussed. DOE

N83-32247# Rockwell International Corp., Golden, Colo.

NEAR-SURFACE METEOROLOGICAL CONDITIONS ASSOCIATED WITH ACTIVE RESUSPENSION OF DUST BY WIND EROSION

C. R. Hodgin 1982 18 p refs Presented at 4th Intern. Conf. on Precipitation Scavenging, Dry Deposition and Resuspension, Santa Monica, Calif., 29 Nov. 1982

(Contract DE-AC04-76DP-03533)

(DE83-006272; RFP-3363; CONF-821136-12) Avail: NTIS HC A02/MF A01

The meteorological conditions associated with extreme winds in the lee of the Colorado Rocky Mountains were studied from the viewpoint of dust resuspension and dispersion. Wind, dispersion, temperature, and dew point conditions occurring near the surface were discussed in detail for a selected event. Near surface wind speeds were compared to observations made at a standard sampling height. These field data were developed to aid in validation and interpretation of wind tunnel observations and application of dispersion models to wind erosion resuspension. Three conclusions can immediately be drawn from this investigation. First, wind storms in nature are quite gusty, with gusts exceeding the mean speed by 50 percent or more. However, wind direction variations are small by comparison. Thus, wind tunnel studies should be able to simulate the large along-flow turbulence, while keeping cross flow turbulence to a moderate level. This also has an application to the puff modeling of high winds. Puff models normally assume that the along-flow dispersion coefficient is equal to the cross-flow value. DOE

N83-32248# Wyoming Univ., Laramie. Dept. of Atmospheric Science.

CLOUD PHYSICS STUDIES IN SCPP (SIERRA COOPERATIVE PILOT PROJECT) DURING 1977-82 AND IN UTAH/1978 Final Report

John D. Marwitz Oct. 1982 27 p refs

(Contract DI-7-07-83-V0001)

(PB83-161307; AS139) Avail: NTIS HC A03/MF A01 CSCL 04B

This final report is a summary of the cloud physics studies by the University of Wyoming investigators as participants in the Sierra Cooperative Pilot Project (SCPP) during 1977 to 1982 and in the Utah Weather Modification Program (UTAH) during 1978. A summary is presented of the projects by season. GRA

N83-32249# Oregon State Univ., Corvallis. Water Resources Research Inst.

VARIABILITY OF PRECIPITATION IN THE PACIFIC NORTHWEST: SPATIAL AND TEMPORAL CHARACTERISTICS

Daniel M. Johnson and John O. Dart May 1982 328 p refs

(PB83-175232; WRRI-77; W83-02178; OWRT-A-050-ORE(2)) Avail: NTIS HC A15/MF A01 CSCL 04B

Spatial and temporal aspects of precipitation in the Pacific Northwest were analyzed for natural variability. The data base consists of monthly, seasonal and annual totals of precipitation for 244 climatological stations in Oregon, Washington and adjacent areas. A complete set of descriptive and inferential statistics was calculated and is presented in tabular form. Maps of key statistics-means, coefficients of variation and interstation correlation coefficients-depict spatial patterns. The 40-year normal period is shown to be sufficient for making probability estimates of seasonal and annual precipitation. Author (GRA)

N83-32250# National Oceanic and Atmospheric Administration, Ann Arbor, Mich. Great Lakes Environmental Research Lab.

GREAT LAKES PRECIPITATION BY MONTHS, 1900-80

Frank H. Quinn and David C. Norton Nov. 1982 32 p refs

(PB83-175737; NOAA-DR-ERL-GLERL-20; NOAA-83031401) Avail: NTIS HC A03/MF A01 CSCL 04B

Accurate values of monthly precipitation are required for simulation, forecasting, and water resource studies of the Great Lakes and their basins. There are often significant errors in the present method of computing these values because of technique problems accentuated when data from preselected stations are missing. Therefore, a monthly precipitation climatology was derived by a modified Thiessen approach using a grid-square technique.

The resulting data set, which represents a major improvement over that presently in use, is presented in the report. GRA

N83-32251# Delaware Univ., Newark.
WIND EFFECTS ON LONGITUDINAL DISPERSION IN OPEN-CHANNEL FLOWS Final Report
Augustus M. Mergenthaler and Jin Wu Dec. 1982 52 p refs
(PB83-179697; PPSP/PPRP-76) Avail: NTIS HC A04/MF A01 CSCL 04B

The effects of wind on the longitudinal dispersion has been studied experimentally in a flume. The study includes the wind effects on open-channel flows, calculation of the dispersion coefficients using flow parameters and determination of the dispersion coefficient from dye tracers. The results generally confirm the theoretical estimate with a decreasing dispersion coefficient under upstream wind conditions and increasing under the downstream wind conditions. GRA

N83-32252# North Carolina State Univ., Raleigh.
STUDIES IN AIR QUALITY METEOROLOGY AT NORTH CAROLINA STATE UNIVERSITY
Walter J. Saucier, Ted L. Tsui, and Gerald F. Watson Mar. 1983 116 p refs
(Grant EPA-805554)
(PB83-181743; EPA-600/3-83-011) Avail: NTIS HC A06/MF A01 CSCL 04B

This report is comprised of summaries of eight investigations into diverse areas of air quality meteorology resulting from a cooperative research effort by graduate students and faculty of the atmospheric sciences program of North Carolina State University and the staff and facilities of the EPA Meteorology and Assessment Division, Research Triangle Park, North Carolina. Research topics include: Meteorological analysis of the St. Louis RAPS data; Atmospheric visibility and suspended particulates; Mesoscale wind structure over complex terrain; Surface winds in mountainous terrain inferred from 850 mb rawinsonde data. Author (GRA)

N83-32253# Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway). Dept. of Science and Technology.
SATELLITE TRANSMISSION OF ODAS-451 DATA DURING JULY AND AUGUST 1982
Kjell Kloster 6 Sep. 1982 18 p
(PB83-183632; CMI-821156-1; NTNF-0243-09164) Avail: NTIS HC A02/MF A01 CSCL 04B

The moored meteorological data buoy ODAS-451 was redeployed south of Iceland in July 82, equipped with PTT for transmission of sensor data to polar orbiting satellites. Taped data from Service Argos has been analyzed and compared with satellite pass information. Dissemination of data onto GTS is discussed. Author (GRA)

N83-32254# Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway). Dept. of Science and Technology.
ODAS-450 TRANSMISSION REGULARITY AND METEOROLOGICAL DATA REPRESENTATIVITY
Kjell Kloster 7 Jun. 1982 19 p
(PB83-183731; CMI-821156-1; NTNF-0243-09164) Avail: NTIS HC A02/MF A01 CSCL 04B

The meteorological data buoy ODAS-450 was moored east of Iceland from May 80 to Bef. 81. Some results on transmission regularity and the representative of the transmitted values for air pressure and wind are reported. GRA

N83-32255# National Hurricane Center, Coral Gables, Fla.
ANNUAL DATA AND VERIFICATION TABULATION ATLANTIC TROPICAL CYCLONES 1982
Gilbert B. Clark Feb. 1983 73 p refs
(PB83-184077; NOAA-TM-NWS-NHC-19) Avail: NTIS HC A04/MF A01 CSCL 04B

This is the ninth report of an annual series prepared by the National Hurricane Center (NHC) to provide a source of summarized data on Atlantic tropical cyclones. In addition to data supplied by the National Weather Service, materials have been furnished by the NOAA National Earth Satellite Services (NESS) Miami Office, and the CARCAH (Chief Aerial Reconnaissance Coordination, all Hurricanes). GRA

N83-32256# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Analysis and Prediction Div.
INTERACTION BETWEEN OBJECTIVE ANALYSIS AND INITIALIZATION. PROCEEDINGS OF THE 14TH STANSTEAD SEMINAR
R. Daley, J. Derome, and D. Williamson, ed. Dec. 1982 205 p refs In ENGLISH; FRENCH summary Seminar held in Lennoxville, Quebec, 12-16 Jul. 1982 Prepared in cooperation with McGill Univ., Montreal
(PB83-186890; NCAR/TN-204) Avail: NTIS HC A10/MF A01 CSCL 04B

The document contains a collection of summaries of lectures presented at the Fourteenth Stanstead Seminar on the interaction between objective analysis and initialization. The lectures both reviewed the fundamentals of commonly used analysis and initialization techniques and presented recent work, with emphasis on current problems. Author (GRA)

N83-32257# National Center for Atmospheric Research, Boulder, Colo. Dept. of Atmospheric Sciences.
COMPARISON OF BAROCLINIC EDDY HEAT TRANSPORT PARAMETERIZATIONS TO A SIMPLIFIED GENERAL CIRCULATION MODEL Thesis - Washington Univ.
Starley Lee Thompson Mar. 1983 180 p refs
(Grant NSF ATM-80-06099)
(PB83-187849; NCAR/CT-71) Avail: NTIS HC A09/MF A01 CSCL 04B

A numerical model of the atmospheric general circulation is developed and its results are compared to the predictions of several theories of meridional heat transport by transient baroclinic eddies. The model is based on the primitive equations and resolves the variable fields by zonal harmonics in longitude and by a discrete grid in latitude. In the standard configuration the model employs zonal wavenumbers 3 and 6 with vertical resolutions of 2, 6, or 10 layers. The model's physical processes are highly simplified compared to those incorporated in comprehensive general circulation models. The atmosphere is assumed to be dry and the surface flat and featureless. The model circulation is driven by diabatic heating determined from parameterizations of the net radiation at the top of the atmosphere. Author (GRA)

N83-32258# National Weather Service, Kansas City, Mo. Central Region.
REGIONAL WEATHER DEPICTION PLOT
Warren E. Sunkel Oct. 1982 32 p
(PB83-194415; NOAA-NWS-CRCP-6; NOAA-83041805) Avail: NTIS HC A03/MF A01 CSCL 04B

Program WXPLOT creates an hourly weather depiction chart for display on the GDM of an AFOS console. The station models used on the WXPLOT chart are similar to those of the NMC weather depiction plot NMCGPHPOW but are intended for use on a regional scale with greater data density. One addition to the NMC station model is a single letter describing the flying weather at the station. WXPLOT is designed as an adjunct to the job stream for plotting hourly weather observations (SAO's) in conventional station model format on a regional basis. GRA

N83-32124# Joint Publications Research Service, Arlington, Va.
PETROSYANTS INTERVIEWED ON RESULTS OF PIGAP PROGRAM
Z. Kanevskiy *In its* USSR Rept.: Earth Sci., No. 27 (JPRS-83829) 6 Jul. 1983 p 1-6 Transl. into ENGLISH from Znaniye-Sila (Moscow), no. 4, Apr. 1983 p 6-8 (For primary document see N83-32123 20-42)
Avail: NTIS HC A04

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N83-32259# Army Coastal Engineering Research Center, Fort Belvoir, Va.
THE ELEVATION AND DURATION OF WAVE CRESTS
William N. Seelig, John P. Ahrens, and William G. Grosskopf Jan. 1983 75 p refs
(AD-A127872; CERC-MR-83-1) Avail: NTIS HC A04/MF A01 CSCL 20/4

The stream-function wave theory of Dean (1974) is used together with monochromatic and irregular laboratory wave data to develop methods for estimating the elevation and duration of wave crests. The resulting prediction techniques are applied to a wide range of wave conditions measured at CERC's Field Research Facility in Duck, North Carolina, and are shown to give reliable and often conservative estimates of crest elevation. The techniques presented in this report can be used for both nonbreaking and breaking wave conditions. Author (GRA)

N83-32260# Naval Postgraduate School, Monterey, Calif. Dept. of Physics.
OCEAN FLOOR GEOMAGNETIC DATA COLLECTION SYSTEM M.S. Thesis
Arnold Richard Gritzke and Robert Henry Johnson, II Dec. 1982 180 p refs
(AD-A127618) Avail: NTIS HC A09/MF A01 CSCL 09/2

The second generation design of the Naval Postgraduate School's ocean-floor geomagnetic data collection system is described with emphasis on modifications for improvement over its predecessor. These improvements include 15 channel parallel analog-to-serial pulse code modulation conversion, fiber optic data link, and radio telemetry to shore recording equipment. The system has flexibility in operating depth, an increase in data acquisition time, synchronization with land site data, and a data format that is readily converted to digital for computer assisted analysis. Author (GRA)

N83-32261# Wisconsin Univ., Madison. Center for Mathematics Research.
ACCURATE COMPUTATIONS FOR STEEP SOLITARY WAVES
J. K. Hunter (Colorado State Univ.) and J.-M. Vanden-Broeck Jan. 1983 22 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-80-01960)
(AD-A127706; MRC-TSR-2470) Avail: NTIS HC A02/MF A01 CSCL 12/1

Finite amplitude solitary waves in water of arbitrary uniform depth are considered. A numerical scheme based on collocation is presented to calculate the highest solitary wave. It is found that the ratio of the amplitude of the wave versus the depth is 0.83322. This value is about 0.006 higher than the values obtained by most previous investigators. In addition another numerical scheme based on an integro-differential formulation is derived to compute solitary waves of arbitrary amplitude. Thse calculations show that the results of Longuet-Higgins and Fenton are not accurate for very steep waves. Graphs and tables of the results are included. GRA

N83-32262# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Snow and Ice Branch.
CHEMICAL FRACTIONATION OF BRINE IN THE MCMURDO ICE SHELF, ANTARCTICA
James H. Cragin, Anthony J. Gow, and Austin Kovacs Mar. 1983 16 p refs
(Grant NSF DPP-77-19565; DA Proj. 4A1-61102-AT-24)
(AD-A127821; CRREL-83-6) Avail: NTIS HC A02/MF A01 CSCL 08/12

During the austral summers of 1976-77 and 1978-79, several ice cores were taken from the McMurdo Ice Shelf brine zone to investigate its thermal, physical and chemical properties. This brine zone consists of a series of superimposed brine layers (waves) that originate at the seaward edge of the ice shelf and migrate at various rates, depending upon their age and position in the ice shelf. The brine in these layers becomes increasingly concentrated as the waves migrate inland through the permeable ice shelf firn. Chemical analyses of brine samples from the youngest (uppermost) brine wave show that it contains sea salts in normal seawater proportions. Further inland, deeper and older brine layers, though slightly highly saline (S>200%), are severely depleted in (SO4)2-/Na+ ratio being an order of magnitude less than that of normal seawater. Analyses of Na+, K+, Ca2+, Mg2+, (So4)2- and C1-, together with solubility and temperature considerations, show that the sulfate depletion is due to selective precipitation of mirabilite, Na2SO41OH2O. The location of the inland boundry of brine penetration is closely related to the depth at which the brine encounters the firn/ice transition. However, a small but measurable migration of brine is still occurring in otherwise impermeable ice; this is attributed to eutectic dissolution of the ice by concentrated brine as it moves into deeper and warmer parts of the McMurdo Ice Shelf. Author (GRA)

N83-32263# Aeronautical Research Associates of Princeton, Inc., N. J.
INTEGRABLE MODELS OF SHALLOW WATER WAVES
Harvey Segur, Allan Finkel (Inst. for Advanced Study), and Hilda Philander Mar. 1983 39 p refs
(Contract N00014-80-C-0048; Grant NSF MCS-81-08814)
(AD-A127816; ARAP-TM-83-3) Avail: NTIS HC A03/MF A01 CSCL 20/4

The Korteweg-de Vries and the Kadomtsev-Petviashvili (KP) equations both model the evolution of relatively long water waves of moderate amplitude as they propagate in shallow water. Both equations are completely integrable. In this paper we review the derivation of each equation as an approximate model of shallow water waves, and compare their solutions with some of the experimental observations of waves in shallow water. We also describe in detail the family of doubly periodic KP solutions. These are the natural two dimensonal generalizations of cnoidal waves in one dimensional; one may think of them as describing 'typical' patterns of nonlinear, two dimensional waves in shallow water. Author (GRA)

N83-32264# Naval Surface Weapons Center, Dahlgren, Va.
ON COMPUTING INSTANTANEOUS GEOCENTRIC TIDES ALONG SATELLITE TRACKS, THE NSWC STT PROGRAM Final Report
E. W. Schwiderski and L. T. Szeto Sep. 1982 101 p refs
(ZR0000101)
(AD-A128568; NSWC-TR-81-264) Avail: NTIS HC A06/MF A01 CSCL 08/3

The authors present three computer programs to compute geocentric tides including ocean and earth tides and ocean-loading effects along parallel satellite tracks from the harmonic ocean tidal constants listed on the NSWC GOTD Tape (Schwiderski and Szeto 1981). The first program prepares a basic standard satellite track (SST), which is shifted parallel to itself to define a 1 x 1 SST grid system. The second program computes harmonic geocentric tide data at all SST grid points, which are stored on three magnetic tapes (SST GTD Tapes 1, 2, and 3). From the prepared SST GTD tapes, the third (SST) program computes instantaneous tides along parallel satellite tracks by a smooth and fast inrepolation scheme. All three programs eliminate various input-error possibilities of their preliminary versions, which have been applied to compute instantaneous geocentirc tides along SEASAT tracks. The program descriptions include corresponding User's Guides and Program Listings. An extended version of the SST program is in preparation. It will include group beat effects on all major tidal components by frequency-wise neighboring minor tidal modes. Author (GRA)

N83-32265# Bristol Univ. (England).
INTERACTION OF WAVES AND CURRENTS
D. Howell Peregrine and Ivar G. Jonsson (Technische Univ., Lyngby) Mar. 1983 91 p refs

(Contract DACW72-80-C-0004)
(AD-A128551; CERL-MR-83-6) Avail: NTIS HC A05/MF A01 CSCL 08/3

This report presents an overview of wave-current interaction, including comprehensive review of references to significant U.S. and foreign literature available through December 1981. Specific topics under review are the effects of horizontally and vertically varying currents on waves, wave refraction by currents, dissipation and turbulence, small- and medium-scale currents, caustics and focusing, and wave breaking. The results of the review are then examined for engineering applications. The most appropriate general-purpose computer program to include wave-current interaction is the Dutch Rijkswaterstaat program CREDIZ, which is based on a parabolic wave equation. Further applications include wave and current forces on structures and possibly sediment transport. The report concludes with a brief state-of-the-art review of wave-current interaction and a list of topics needing further research and development. GRA

N83-32266# Hawaii Inst. of Geophysics, Honolulu.
OCEANIC Pn/Sn PHASES: A QUALITATIVE EXPLANATION AND REINTERPRETATION OF THE T-PHASE
Daniel A. Walker Nov. 1982 25 p refs
(Contract N00014-75-C-0209; NR Proj. 083-603)
(AD-A128343; HIG-TR-82-6) Avail: NTIS HC A02/MF A01 CSCL 08/11

The combined effects of: (1) differing efficiencies between Pn and Sn energy transmission across the basement-sediment interface; (2) ocean surface reflections; (3) Pn to Sn conversions; and, (4) large lateral variations in the crust and upper mantle are used to formulate a working hypothesis which appears to explain, qualitatively, many observations of high-frequency Pn/Sn phases throughout the western, northern, and central Pacific. Also, the concept of Pn/Sn phases as sources of energy at the basement-sediment interface is suggested as a possible mechanism for T-phase generation through scattering or Stoneley wave generation. Author (GRA)

N83-32267# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Ocean Science and Technology Lab.
GLOBAL ANALYSIS OF THE SHALLOW GEOLOGY OF LARGE-SCALE OCEAN SLOPES
James Andrew Green and J. E. Matthews May 1983 278 p refs
(AD-A128208; NORDA-TN-197) Avail: NTIS HC A13/MF A01 CSCL 08/10

Large-scale ocean slopes have continental-slope dimensions (e.g., slope inclinations exceeding 1 degree for relief of 2000 m). Approximately 40% are related to continental margins, 40% to features with oceanic crust, and 20% to unknown origins or overlap with the first two groups. Of the slopes, 75% are laterally continuous (lateral slopes), and the remaining 25% form the sides of conical-shaped features. Groupings and ranges have been established for the following lateral slope parameters: ocean section, top boundary province, bottom boundary province, relief, slope angle, surface-sediment grain size, plate-tectonic association, shape, outcrop type in the upper 200 m, percent of slope with outcrop, sediment thickness, and basement type. Mapping and computer adaption of parameter compilations reveal global data distributions, global averages, parameter relationships, and applied classification methods. Global averages are 3.8 degrees for slope angle, 3035 m for relief, and 38% for percent of slope with outcrop. Strongest relationships occur among top boundary province, bottom boundary province, plate-tectonic association, and surface-sediment type. Preferred clustering of parameter relationships reveal four model groups for lateral slopes. GRA

N83-32268# Naval Ocean Research and Development Activity, Bay St. Louis, Miss.
K-BAND RADIOMETRIC MAPPING OF SEA ICE Final Report
R. D. Ketchum, Jr., L. D. Farmer, and J. P. Welsh, Jr. Jan. 1983 23 p refs
(AD-A128205; NORDA-TN-179) Avail: NTIS HC A02/MF A01 CSCL 08/12

The Ka-band radiometric mapping system (KRMS), an airborne 33.6 GHz passive microwave imager, was flown over sea ice in the Bering, Chukchi and Beaufort Seas and in the Canadian Archipelago. The data discussed was obtained on 14 and 16 May 1982. The system, as flown, measures the relative brightness temperature (T sub B) of the objects radiating toward the rotating antennae. Differences in T sub B appear to be related to variation in ice thickness, surface moisture, deformation processes and melting and refreezing processes. A snow/ice interface development is hypothesized to relate to decreasing T sub B as ice increases in age. The T sub B of undisturbed new ice is warmer than open water. The T sub B of first-year ice appears to decrease with increasing age and seems to be less variable than the thinner ice types. Multi-year ice appears colder than first-year ice but warmer than open water. Two different categories of multi-year ice floes were observed. Arctic basin multi-year floes were distinguished by the rounded shapes, colder T sub B and irregular distribution of frozen melt ponds (warmer T sub B). Archipelago multi-year floes were less rounded, had warmer T sub B and displayed a more regular (homogeneous) distribution of frozen melt ponds. Both categories of multi-year floes were radiometrically colder than the warmer (higher T sub B) first-year ice types surrounding them and thus were readily identified. GRA

N83-32269# Naval Air Development Center, Warminster, Pa. Sensors and Avionics Technology Directorate.
IMPULSE RESPONSE OF THE OCEAN FLOOR NONLINEAR TECHNIQUES FOR MEASUREMENT ENHANCEMENT Final Report
Thomas Gabrielson Apr. 1983 65 p refs
(AD-A128578; NADC-82253-30) Avail: NTIS HC A04/MF A01 CSCL 17/1

This report describes a procedure for enhancement of impulse response measurements of the ocean floor. When these measurements are made with explosive charges, the source waveshape, being long and oscillatory, obscures much of the detail in the received signal. The effects of this source waveform can be eliminated by various forms of deconvolution, one of which - homorphic deconvolution - is very flexible in its application and does not require foreknowledge of the source waveshape. Homomorphic deconvolution is a nonlinear process based on filtering the logarithmic spectrum of a signal. The special problems such as phase reconstruction and signal conditioning are discussed in the context of ocean floor measurements with explosives, and a computer code is presented that generates and checks the log-spectrum. Author (GRA)

N83-32270# National Oceanic and Atmospheric Administration, Honolulu, Hawaii. International Tsunami Information Center.
ANNOTATED TSUNAMI BIBLIOGRAPHY: 1962-1976
G. Pararas-Carayannis, B. Dong, and R. Farmer Aug. 1982 512 p refs
(DE83-900003; NUREG/CR-2840) Avail: NTIS HC A22/MF A01; Also Avail: SOD HC $12.00

This compilation contains annotated citations to nearly 3000 tsunami-related publications from 1962 to 1976 in English and several other languages. The foreign-language citations have English titles and abstracts. DOE

N83-32271# Institute of Oceanographic Sciences, Wormley (England).
ESTIMATION OF WAVE SPECTRA FROM WAVE HEIGHT AND PERIOD
D. J. T. Carter 1982 21 p refs Sponsored by Dept. of Energy and Industry
(IOS-135; MIAS-Publ-4) Avail: NTIS HC A02/MF A01

Formulas are derived for estimating single-peaked sea surface wave spectra as a function of frequency from values of significant wave height and wave period. The formulae are based upon a general spectral formula suggested by Bretschneider - recommended by the International Ship Structures Congress'

committee on environmental conditions - and include the Pierson-Moskowitz and Joint North Sea Wave Project spectra. Author (ESA)

N83-32272# Institute of Oceanographic Sciences, Wormley (England). Natural Environment Research Council.
A NEW METHOD FOR THE ANALYSIS OF EXTREMES APPLICABLE TO ONE YEAR'S DATA
P. G. Challenor 1982 26 p refs Sponsored by Dept. of Energy (IOS-142) Avail: NTIS HC A03/MF A01

The method of Weissman to determine return values of wave height is extended. The method estimates return values from only one year's data, assuming that the data are independent and identically distributed. Fisher and Tippett's extreme value theory is used. Confidence limits are given for the parameters of the distribution and also for estimates of 50 and 100 year return values. The estimates derived from experimental data differ significantly from those obtained by an analysis of extremes and are not consistent with each other. The reasons for these discrepancies are discussed. Author (ESA)

N83-32273# Institute of Oceanographic Sciences, Birkenhead (England). Natural Environment Research Council.
THE WEST COAST SURGE PREDICTION EXPERIMENT 1981-82
R. A. Flather and R. Proctor 1982 84 p refs Sponsored by Ministry of Agriculture Fisheries and Food
(IOS-150) Avail: NTIS HC A05/MF A01

Two storm surge prediction models were compared. The CSM model uses forecast wind and pressure data from an atmospheric model to predict surge storm tides. A specific West coast model (WCM) was also developed to cover the Irish sea and the Bristol channel with a grid 1/3 the size of the CSM. It is found that overall the WCM model does not materially improve on the accuracy achieved by the CSM under the present schema. The basic sea model to be adopted by the meteorological office must be of the same type as the CSM, while high resolution local models may cover the most important shallow water areas. Author (ESA)

N83-32274# Woods Hole Oceanographic Institution, Mass.
BIBLIOGRAPHY OF TECHNICAL REPORTS, 1982
Nancy A. Marsh, comp. Jan. 1983 14 p
(PB83-191064; WHOI-83-2) Avail: NTIS HC A02/MF A01 CSCL 08A

The bibliography includes listings on the subject areas of: Ocean currents, oceanographic surveys, physical oceanography, fisheries and geochemistry. Author (GRA)

N83-32275# Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway). Dept. of Science and Technology.
ODAD-451 DATA BUOY IN THE NORTH-EAST ATLANTIC (61 DEG 36'N, 13 DEG 24'W) Field Report, 18 Feb. - 20 Jul. 1982
Thor Kvinge 2 Sep. 1982 34 p
(PB83-183806; CMI-821151-3; NTNF-0243-09164; FR-3) Avail: NTIS HC A03/MF A01 CSCL 08J

The ODAS-451 is moored in the North-East Atlantic (61 deg 36 min, 13 deg 24 min). The technical details of mooring system and redeployment operation are described. The data transmission system is altered so as to transmit the data via ARGOS and HF-radio in parallel. GRA

N83-32276# New Hampshire Univ., Durham.
DISTRIBUTION OF TIDAL BOTTOM STRESS IN A NEW HAMPSHIRE ESTUARY
M. Robinson Swift and Wendell S. Brown Feb. 1983 45 p refs Prepared in cooperation with National Ocean Survey, Rockville, Md., and Maine Univ., Orono
(Grants NSF OCE-78-26229; NOAA-04-8-M01-79)
(PB83-184085; UNH-MP-T/DR-SG-83-2) Avail: NTIS HC A03/MF A01 CSCL 08J

Estimates of area averaged, total bottom stress are made for four channel segments of the Great Bay Estuary, New Hampshire. Sea level and current measurements are used to estimate pressure gradient and acceleration terms in the equation of motion, while the equation of motion itself a used to infer the remaining stress term. Dynamic terms, bottom stress values, friction coefficients and energy dissipation rates are estimated for each site. To aid in interpreting the results, sea level and current data are subject to a harmonic analysis to determine the tidal constituents. Author (GRA)

N83-32125# Joint Publications Research Service, Arlington, Va.
AUTOMATION OF HYDROPHYSICAL RESEARCH
B. O. Helyepo and H. V. Smyrnov *In its* USSR Rept.: Earth Sci., No. 27 (JPRS-83829) 6 Jul. 1983 p 12-19 refs Transl. into ENGLISH from Akad. Nauk Ukr. RSR (Kiev), no. 3, Mar. 1983 p 63-68 (For primary document see N83-32123 20-42)
Avail: NTIS HC A04

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N83-32277*# National Aeronautics and Space Administration, Washington, D. C.
PECULIARITIES IN FORMATION OF ARABIDOPSIS THALIANA (L.) HEYNH, GENERATIVE ORGANS UNDER SPACE FLIGHT CONDITIONS
Ye. L. Kordyum and I. I. Chernyayeva Jul. 1983 8 p refs Transl. into ENGLISH from Dopovidi Akad. Nauk. Ukr. RSR, (USSR), no. 8, Ser. B., 1982 p 67-70 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-77263; NAS 1.15:77263) Copyright. Avail: NTIS HC A02/MF A01 CSCL 06C

Peculiarities in the formation of the andrecium and gynecium elements are described for Arabidopsis plants grown from the stages of two cotyledonous leaves in the Svitoblok-1 device on board the Salyut 6 orbital research station and in the laboratory. It is established that flower buds and flowers, normally formed in habitus, contain sterile elements of andrecium and gynecium whose degeneration occurs at different developmental stages of the Arabidopsis plants in the experiment under conditions of weightlessness. Author

N83-32278# Houston State Psychiatric Inst., Tex. Research Inst. of Mental Sciences.
EVOKED POTENTIAL STUDIES OF THE EFFECTS OF IMPACT ACCELERATION ON THE MOTOR NERVOUS SYSTEM
B. Saltzberg, W. D. Burton, Jr., N. R. Burch, C. L. Ewing, D. J. Thomas, M. S. Weiss, M. D. Berger, A. Sances, Jr., P. R. Walsh, J. Myklebust et al 1983 22 p refs Prepared in cooperation with Naval Biodynamics Lab., New Orleans and Medical Coll. of Wisconsin, Milwaukee
(Contract N00014-76-C-0911)
(AD-A127562) Avail: NTIS HC A02/MF A01 CSCL 06/19

The initial results of a continuing investigation into the effects of various levels of impact acceleration on the functional integrity of the motor nervous system are summarized. The results are based on the measurement of alterations in neural transmission along the motor pathway of the Rhesus monkey as revealed by latency and amplitude changes in the motor pathway evoked potential (EP) following the delivery of various levels of impact acceleration to a test vehicle. The EPs were produced by electrical stimulation of and recording from the motor pathway of experimental animals subjected to -Y (lateral impact) acceleration and animals subjected to -X (frontal impact) acceleration. High resolution latency and amplitude measures of the EP recorded from these animals before and after impact were tracked so that the time course of recovery of nerve propagation following impact could be accurately assessed. Analysis of these EP measures revealed that the time course of recovery to pre-impact values is directly related to the intensity of the acceleration impulse delivered to the test vehicle. GRA

N83-32279# Naval Aerospace Medical Inst., Pensacola, Fla.
THE THERMAL BASIS FOR DISRUPTION OF OPERANT BEHAVIOR BY MICROWAVES IN THREE ANIMAL SPECIES
John O. DeLorge Jun. 1982 22 p refs
(MF5852402C)
(AD-A127370; NAMRL-1286) Avail: NTIS HC A02/MF A01 CSCL 06/18

A large variety of microwave producing devices are used in contemporary naval communications and weapons systems. Public and scientific concern about potential biological effects of microwave irradiation such as produced by these various devices requires documentations of such effects. Currently, the only well documented direct effect of microwaves is heating of the exposed organism. The present report is of a series of studies whose aim was to explore several microwave frequencies and their effect on performance and simultaneously to investigate the relationship to core heating in the exposed animals. Three difficult sized species of animals were used so that generalization to larger animals could be made. Rats, squirrel monkeys, and rhesus monkeys showed consistent effects of 60-minute exposures to microwaves when their body temperatures were increased at least 1 C above baseline temperatures. Performance was not reliably affected when body temperatures remained below this level. Greater intensities of microwaves were required to influence the animals' temperature and behavior as the animal size increased. A direct relationship between frequency and power density was observed in the rhesus monkey; e.g., as the frequency of the microwaves increased, the power density needed to affect behavior and temperature also increased. GRA

N83-32280# Naval Aerospace Medical Research Lab., Pensacola, Fla.
OPERANT BEHAVIOR AND COLONIC TEMPERATURE OF RHESUS MONKEYS, MACACA MULATTA, EXPOSED TO MICROWAVES AT FREQUENCIES ABOVE AND NEAR WHOLE-BODY RESONANCE Final Report
John O. deLorge Jan. 1983 24 p refs
(AD-A127326; NAMRL-1289) Avail: NTIS HC A02/MF A01 CSCL 06/18

Microwave radiation is extensively used in environments occupied by naval personnel. Recently scientific reports have indicated that behavioral changes can be induced by relatively low levels of microwave energy. The reported behavioral changes do not reflect the beneficial or detrimental nature of such changes. The present study was designed to produce in a non-human primate a behavior analogous to human behavior and discover if that behavior was enhanced, disrupted or not affected by microwave energy from radar sources similar to those currently in use in naval communications and weapons systems. Performance by five rhesus monkeys on an observing-response task requiring sustained vigilance was assessed when the monkeys were consecutively exposed to microwaves at frequencies of 1.3 GHz, 5.8 GHz, and 225 MHz. Observing-response performance was impaired at increasingly intense power densities at all frequencies. The threshold power density necessary to disrupt performance at 225 MHz was 8.1 mW/sq.cm.; at 1.3 GHz it was 57 mW/sq.cm, and at 5.8 GHz it was 140mW/sq.cm. These power densities were associated with increases in colonic temperatures above sham exposure levels. The mean increase was typically in the range of 1 C and response rate changes were not observed in the absence of concomitant temperature increases. GRA

N83-32281# Technology, Inc., San Antonio, Tex. Life Sciences Div.
TEMPERATURE CYCLING IN RATS EXPOSED REPETITIVELY TO RADIOFREQUENCY RADIATION Final Report, 1 Sep. 1980 - 31 Aug. 1981
Ferdinand Heinmets, Melvin R. Frei, Richard N. Friedman, James R. Jauchem, and Charles Ballentine Brooks AFB, Texas School of Aerospace Medicine Dec. 1982 33 p refs
(Contract F33615-80-C-0614; AF Proj. 7757)
(AD-A126895; SAM-TR-82-48) Avail: NTIS HC A03/MF A01 CSCL 06/18

A series of temperature cycling experiments during radiofrequency radiation (RFR) exposure of rats was performed. This type of exposure procedure permits electromagnetic energy to be introduced into biological systems while the systems are maintained at physiologically acceptable temperatures. Experiments were carried out at various average power densities (50-200 mW/sq cm), using continuous wave (CW) and pulsed radiation while the carrier frequency was maintained at 2.06 GHz. Single-day RFR exposures produced no observable effect on temperature regulation of rats in terms of heat-dissipation efficiency. Repeated exposure of rats during several months revealed that the heat-dissipation time (D) gradually increased, indicating reduced efficiency. After a prolonged resting period, however, the rat's ability to dissipate heat showed considerable improvement. No significant difference in thermoregulation was observed when CW and pulsed RFR exposures at pulse durations of 1-10 ms were compared. Author (GRA)

N83-32282# School of Aerospace Medicine, Brooks AFB, Tex.
RETROGRADE AMNESIA, IN RATS, PRODUCED BY ELECTRON BEAM EXPOSURE Final Report, Jul. - Sep. 1982
Thomas G. Wheeler, Kenneth A. Hardy, and Dennis W. Blick Feb. 1983 30 p refs
(AF Proj. 7757)
(AD-A126870; SAM-TR-83-3) Avail: NTIS HC A03/MF A01 CSCL 05/10

It has been demonstrated that electron beam exposure produces retrograde amnesia (RA). RA production was evaluated using a single trial avoidance task across a 10,000 dose range for 10 microseconds, 1 microsecond, and 0.1 microseconds pulsed exposures. The dose-response curve obtained at each pulse duration showed significant RA production. The most effective dose range was 0.1-10 rads at a dose rate of 1 million rad/sec. Our conclusion was that the RA effect might be due to sensory system activation which provided a novel stimulus that masked previous stimuli (produced RA). GRA

N83-32283# California Univ., Berkeley. Lawrence Berkeley Lab. Biology and Medicine Div.
IDEAS ON THE UNIFICATION OF RADIOBIOLOGICAL THEORIES
Stanley B. Curtis Oct. 1982 12 p refs Presented at the 8th Symp. on Microdosimetry, Juelich, West Germany, 27 Sep. - 1 Oct. 1982 Submitted for publication
(Contract DE-AC03-76SF-00098)
(DE83-004188; LBL-15193; CONF-82031-12) Avail: NTIS HC A02/MF A01

A unified formulation of cell inactivation has been developed that incorporates major ideas of several theories (hypotheses) of how individual mammalian cells are inactivated by ionizing radiation. Elements from the repair-misrepair, lethal-potentially lethal, sublesion interaction, and track structure models are combined to produce a single set of mutually compatible hypotheses. DOE

N83-32284# Iowa State Univ. of Science and Technology, Ames. Dept. of Botany.
PROLINE METABOLISM IN PLANTS UNDER ENVIRONMENTAL STRESSES Progress Report, 1 Apr. - 31 Dec. 1982
Cecil R. Stewart and Thomas E. Elthon Dec. 1982 27 p refs
(Contract DE-AC02-82ER-12028)
(DE83-002735; DOE/ER-12028/1) Avail: NTIS HC A03/MF A01

The basic mechanisms involved in proline accumulation by plants under environmental stresses is summarized. This accumulation is thought to be part of the process of osmoregulation - an adaptive phenomenon that occurs in plants and other organisms to aid survival in arid and saline environments. This understanding will aid in developing cultural strategies for producing food and biomass in marginal lands and environments. Proline transport into the mitochondrial matrix is protonmotive, thus energy dependent but not driven by an electrical gradient. Transport rates exceed oxidation rates under non-phosphorylating conditions. The nature of specific inhibition of proline oxidation using an artificial inhibitor, thiazolidine-4-carboxylate was studied. This compound mimics the

effects of stress on proline oxidation. Attempts were made to obtain cell free proline synthesis in pursuit of the enzyme, gamma glutamokinase which is probably the enzyme most affected by stress. DOE

N83-32285# National Bureau of Standards, Washington, D.C.
NBS (NATIONAL BUREAU OF STANDARDS) AND INDUSTRIAL BIOTECHNOLOGY: INSTRUMENTATION AND ASSOCIATED MEASUREMENT NEEDS
Thomas C. OBrien Mar. 1983 63 p refs
(PB83-191114; NBSIR-83-2667) Avail: NTIS HC A04/MF A01 CSCL 06B

This report describes some initial steps NBS could take to identify industrial biotechnology's instrument needs and associated measurement related problems, areas where there will likely be an industry underinvestment in resolving these needs/problems, and the appropriate research and service activities NBS could undertake in order to be responsive to some of this industry's infrastructure technology needs. It accomplishes this by: (1) examining biotechnology instrumentation trends; (2) identifying specific instrumentation measurement related R&D barriers and opportunities; and (3) providing examples of NBS scientific capabilities related to industrial biotechnology instrument needs and instrument development directions. GRA

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N83-32286*# Bionetics Corp., Cocoa Beach, Fla. Biomedical and Environmental Lab.
SPACE TRANSPORTATION SYSTEM BIOMEDICAL OPERATIONS SUPPORT STUDY
Stanley C. White 30 Apr. 1983 380 p refs
(Contract NAS10-10285)
(NASA-CR-166834; NAs 1.26:166834; BIO-1) Avail: NTIS HC A17/MF A01 CSCL 06P

The shift of the Space Transportation System (STS) flight tests of the orbiter vehicle to the preparation and flight of the payloads is discussed. Part of this change is the transition of the medical and life sciences aspects of the STS flight operations to reflect the new state. The medical operations, the life sciences flight experiments support requirements and the intramural research program expected to be at KSC during the operational flight period of the STS and a future space station are analyzed. The adequacy of available facilities, plans, and resources against these future needs are compared; revisions and/or alternatives where appropriate are proposed. E.A.K.

N83-32287# Royal Aircraft Establishment, Farnborough (England).
THE PROBLEMS OF PROTECTION AGAINST OPTICAL RADIATION
M. DiPofi and E. Righi Jan. 1983 38 p refs Transl. into ENGLISH from Ann. 1st Super. Sanita (Italy), v. 16, p 443-476
(BR88714; RAE-Trans-2104) Copyright. Avail: NTIS HC A03/MF A01

The damaging effects on man of electro-magnetic radiation in the visual and near-visual parts of the spectrum are considered. There are two main danger areas, first with regard to the burning effects on the unprotected skin and secondly with regard to effects on the unprotected eye, leading to retinal burns and even blindness. The damaging effects are considered for ultra-violet, visible, infrared and laser radiation, particularly for the latter in view of the widespread use of lasers at the present time. The questions discussed are protective measures for operatives who may be subjected to damaging radiation, and that of periodic medical checks for them. From this it is concluded that more stringent safety levels must be defined for the amounts of radiation of each kind to which operatives may be subjected, safely, during their working periods. Casual users of such equipment need to be made aware of its potentially dangerous nature and the necessary safety measures to be taken. Author

N83-32288# Duke Univ. Beaufort, N.C. Dept. of Ophthalmology.
DETECTION OF RETINAL ISCHEMIA PRIOR TO BLACKOUT BY ELECTRICAL EVOKED CORTICAL RESPONSES Final Report
Myron L. Wolbarsht Warmister, Pa. NADC Nov. 1982 21 p refs
(Contract N62269-81-C-0742)
(AD-A126855; NADC-82263-60) Avail: NTIS HC A02/MF A01 CSCL 06/5

Loss of function in the peripheral retina due to ischemia has been successfully monitored by retinal ganglion cell responses to external electrical stimulation of the eye which evokes cortical responses detectable by scalp electrodes. The retinal ischemia has been produced by increased intraocular pressure. Cessation of both the retinal ganglion cell impulses and cortical evoked potentials is observed when the retinal blood flow is halted, although the choroidal blood flow is continued as shown by persistence of the electroretinogram (ERG) a-wave and the disappearance of all other ERG components. GRA

N83-32289# Army Medical Research Inst. of Infectious Diseases, Frederick, Md.
CIRCADIAN GROWTH HORMONE AND PROLACTIN BLOOD CONCENTRATION DURING A SELF-LIMITED VIRAL INFECTION AND ARTIFICIAL HYPERTHERMIA IN MAN Interim Report
David L. Bunner, Elena Morris, and Robert C. Smallridge 14 Apr. 1983 25 p refs
(AD-A127501) Avail: NTIS HC A02/MF A01 CSCL 06/1

Growth hormone and prolactin blood concentrations were measured in five human volunteers over 28-hour periods including 24 hourly samples (0800 h to 0800 h) followed by an oral glucose tolerance test (0800 h1100 h) both preexposure and during the peak febrile phase of a self limited viral infection, Sandfly fever. Several months after recovery, three of the subjects were studied for 24 hour periods while they sat in a tub of water at 41 C for 2 hours from 1300 to 1500 hours. During all studies, meal times (0800 h, 1130 h, 1630 h) and dark phase (2300 h-0700 h) were fixed. Growth hormone concentrations were strikingly elevated throughout the 24 hours study done during the febrile period of Sandfly fever infection ($P<.01$) except for the period of normal nocturnal release when they were not significantly different from the baseline study. No additional nocturnal surge was noted above the already elevated growth hormone values during the viral induced fever. Growth hormone valuss tended to decline slowly during the night but increased considerably during the glucose tolerance test the following morning. These changes were similar to responses previously reported in patients with cases of malnutrition. A clear cut increase in growth hormone concentrations ($P<.001$) was also seen during a brief 2 hour period of artificial hyperthermia, suggesting that elevated body temperature alone may explain part of the increase in growth hormone values seen during the fever of infection. GRA

N83-32290# Naval Aerospace Medical Inst., Pensacola, Fla.
TWO EXPERIMENTS ON LABORATORY-INDUCED MOTION SICKNESS. PART 1: ACUPRESSURE. PART 2: REPEATED EXPOSURE Interim Report
J. Michael Lentz 10 Dec. 1982 13 p refs
(MF58524005)
(AD-A127327; NAMRL-1288) Avail: NTIS HC A02/MF A01 CSCL 06/19

These experiments were part of a continuing effort to find motion sickness preventatives and explore methods for predicting individual adaptive capabilities. Experiment 1 is a pilot study investigating the effectiveness of an acupressure method to prevent laboratory induced motion sickness. Experiment 2 is a pilot study investigating consecutive day adaptation to a laboratory induced motion sickness test. The results from Experiment 1 indicated that the acupressure treatment as applied in this study to a group

of airsick referrals was not effective in altering the signs and symptoms of motion sickness produced by a brief laboratory provocative test. This group of subjects did not show a reduction in motion sickness scores from the first to the second day of testing. Data from Experiment 2 indicate a statistically significant reduction in rater and self-rate scores across consecutive day exposure to this nauseogenic laboratory test. Further testing will be necessary to determine why consecutive day adaptation was not evident in Experiment 1. It is possible that a characteristic of airsick referrals like those in Experiment 1 is a slow rate of adaptation to early exposures. Author (GRA)

N83-32291# Florida Univ., Gainesville.
SLEEP DEPRIVATION AND PERFORMANCE: THE OPTIMUM USE OF LIMITED SLEEP PERIODS Final Report, Apr. 1980 - Mar. 1981
Wilse B. Webb Apr. 1983 51 p refs
(Contract DAMD17-80-C-0058; DA Proj. 3E1-62771-A-804)
(AD-A126934) Avail: NTIS HC A04/MF A01 CSCL 05/20

The performance of three groups of young adult subjects has been measured across a 72 hour period. A computer programmed battery of tests was used which included test established as sensitive to sleep loss (auditory vigilance, addition and subjective scales), and a cognitive battery (memory tasks, anagrams, word detection, visual search, line judgements with various feedbacks, object usage, reasoning, digit symbols). The experimental variable was the placement of four hours of sleep opportunities. The control group had no sleep, one experimental group slept from 10-12 PM prior to 'night' two and three (preparatory sleep) and one slept from 8 to 10 AM after 'nights' two and three (recovery sleep). This report presents preliminary analysis of the date as well as data analysis completed on earlier continuous performance measures. Author (GRA)

N83-32292# Army Aeromedical Research Unit, Fort Rucker, Ala.
ANNOTATED BIBLIOGRAPHY OF USAARL (UNITED STATES ARMY AEROMEDICAL RESEARCH LABORATORY) TECHNICAL AND LETTER REPORTS, 1 JUNE 1963 - 30 APRIL 1983
Apr. 1983 179 p
(AD-A127451) Avail: NTIS HC A09/MF A01 CSCL 05/2

Technical and Letter Reports published at the U.S. Army Aeromedical Research laboratory, Ft. Rucker, Alabama from 1 Jun 1963 to 30 April 1983 are included in this annotated bibliography. Subject areas covered include aviation medicine bioengineering, bio-optics, acoustics, and aviation psychology. Arrangement is in chronlogical sequence with subject, author, and a cross-index of joint reports. Author (GRA)

N83-32293# SRI International Corp., Menlo Park, Calif.
BIOEFFECTS OF RADIOFREQUENCY RADIATION: A REVIEW PERTINENT TO AIR FORCE OPERATIONS Final Report, Nov. 1981 - Mar. 1983
Louis N. Heynick and Peter Polson Mar. 1983 186 p refs
(Contract F33615-82-C-0604)
(AD-A128515; SAM-TR-83-1) Avail: NTIS HC A09/MF A01 CSCL 06/18

The primary purpose of this review is to present analyses of research results and other pertinent information on the biological effects of radiofrequency radiation (RFR) to serve as a basis for determining whether the health of people exposed briefly or continuously to the RFR transmitted by proposed or currently operating Air Force RFR-emitting systems is likely to be affected adversely. Representative research results were selected from the large body of literature on the bioeffects of RFR and analyzed. The selection included those most significant scientifically and most pertinent to RFR frequencies and intensities likely to be encountered in regions, around such systems, that are accessible occupationally or to the general public. Discussed first as background information are the increasing use of RFR emitters by the public, private, and governmental sectors; measurements by the Environmental Protection Agency of environmental levels of RFR in selected U.S. cities; problems of risk assessment; and current and proposed exposure standards in various countries. The review of RFR bioeffects proper is in two major parts. In the first, physical effects are discussed, including postulated mechanisms of interaction of continuous-wave and modulated (including pulsed) RFR for both thermal and nonthermal effects. The concept of specific absorption rate is described. GRA

N83-32294# Army Research Inst. of Environmental Medicine, Natick, Mass.
HYPOHYDRATION AND ACCLIMATION: PLASMA RENIN ACTIVITY AND ALDOSTERONE DURING HEAT/EXERCISE STRESS
Ralph P. Francesconi, Michael N. Sawka, and Kent B. Pandolf 10 Mar. 1983 22 p refs
(AD-A128154; USARIEM-M15/83) Avail: NTIS HC A02/MF A01 CSCL 06/19

This study was designed to assess the effects of hydration, acclimation, and environment on the response of fluid regulatory hormones to exercise. Sixteen subjects exercised (1.34 m/sec), both pre- and post-acclimation, when euhydrated or hypohydrated (-5% of body weight) in a comfortable (20 C, rh = 40%), hot-wet (35 C, rh = 79%), or hot-dry (49 C, rh = 20%) environment. While light exercise in a thermoneutral environment had no effects on plasma levels of renin activity (PRA) or aldosterone (ALD), exercise in both hot environments resulted in significantly increased levels of these hormones. Increments in both PRA and ALD were greater when hypohydrated, and PRA effects were significantly moderated by heat acclimation in both the euhydration and hypohydration experiments. While PRA and ALD responses were generally correlated, acclimation did not consistently attenuate ALD increments. We concluded that hydration state, acclimation level, and environmental conditions all affected the responses of these hormones to light exercise. Author (GRA)

N83-32295# Army Military Personnel Center, Alexandria, Va.
COMPARISON OF WEIGHT TRAINING AND CALISTHENTIC EXERCISE PROGRAMS IN DEVELOPING STRENGTH AND MUSCULAR ENDURANCE IN UNITED STATES ARMY RECRUITS M.S. Thesis. Final Report
Robert George Boyko May 1983 93 p refs
(AD-A128067) Avail: NTIS HC A05/MF A01 CSCL 06/14

This investigation attempted to find the most effective program for developing upper body strength and muscular endurance by comparing the effectiveness of the current Army physical training program used in Initial Entry training with four other supplemental programs. The subjects for this investigation were 214 Army recruits. The subjects were divided into five groups: the current Army training program group, an alternate day calisthenics group, a daily calisthenics group, an alternate day weight training group, and a daily weight training group. The soldiers in all five groups were tested on the pushup test, the one-repetition maximum bench press test, and the 75 percent of one repetition maximum bench press test. The tests were given on three occasions: before the start of training, in the middle of the training period, and at the conclusion of the seven-week training period. The results of the investigation showed that there were no significant differences between the five groups on the pushup test at the end of the seven-week training period. There were significant differences between both weight training groups and the alternate day calisthenic group on the bench press tests. There were no significant differences between the daily and alternate day training groups on any of the three tests at the end of the seven-week training period. GRA

N83-32296# Army Research Inst. of Environmental Medicine, Natick, Mass.
METABOLIC AND VASCOMOTOR INSULATIVE RESPONSES OCCURRING ON IMMERSION IN COLD WATER
Louis H. Strong, Gin K. Gee, and Ralph F. Goldman Apr. 1983 39 p refs
(DA Proj. 3E1-62777-A-879)
(AD-A128021; USARIEM-M-20/83) Avail: NTIS HC A03/MF A01 CSCL 06/19

The metabolic heat production of twenty male subjects

undergoing total immersion in water between 36 C and 20 C was measured as functions of time and water temperature. These were converted to explicit linear functions of core (Tre) and mean skin (Tsk) temperatures for each individual immersion. The functions were used to define planes of thermogenic activity which allowed comparison of the threshold and magnitude of shivering between individuals of any morphological group. The thermogenic planes showed a much steeper slope with respect to the Tsk axis for small. Thin men than for large, fat men, while men of average weight and fat composition exhibited an intermediate slope. Small, lean men also exhibited thermogenic planes having steeper slopes with respect to the Tre axis than did average men. Whole body insulation was evaluated for each individual immersion. Analysis showed that small, lean men maximally vasoconstrict at higher bath temperatures than did large, fat men and that small, lean men were unable to maintain their maximum whole body insulation before the latter attain their maximum insulation. The decline in insulation, seen above a certain critical metabolic level, reflects the increasing muscle blood flow necessary to support active shivering; this critical level appears to be 150 W in small to average size subjects. GRA

N83-32297# Smith-Kettlewell Inst. of Visual Sciences, San Francisco, Calif. Medical Research Inst.
VELOCITY DISCRIMINATION IN THE PERIPHERAL VISUAL FIELD Research Progress and Forecast Report
Suzanne P. McKee 25 Apr. 1983 6 p refs
(Grant AF-AFOSR-0345-82; AF Proj. 2313)
(AD-A127949; AFOSR-83-0371TR) Avail: NTIS HC A02/MF A01 CSCL 05/10

Human obervers can discriminate differences in velocity of about 6% everywhere in the visual field. In the periphery the optimum velocity is faster than the optimum range in the fovea. The basis of velocity discrimination is the angular velocity of the target, not the temporal frequency of the stimulus. Author (GRA)

N83-32298# Army Research Inst. of Environmental Medicine, Natick, Mass.
THERMOREGULATORY RESPONSES TO UPPER BODY EXERCISE
Michael N. Sawka, Nancy A. Pimental, and Kent B. Pandolf May 1983 19 p refs
(DA Proj. 3E1-62777-A-879)
(AD-A127884; USARIEM-M21/83) Avail: NTIS HC A02/MF A01 CSCL 06/19

The purpose of this study was to compare thermoregulatory responses between upper body and lower body exercise. Nine male subjects performed 60 minutes of arm crank (AC) and cycle (CY) exercise at the same absolute intensity (oxygen uptake = 1.6 1/min-1) and at the same relative intensity (60% of ergometer specific peak oxygen uptake) in a temperature (24 C, 20% rh) environment. During the absolute intensity experiments, rectal temperature and sweating rate responses were essentially the same for both modes of exercise. In addition, differences were not found for chest, back, arm or thigh skin temperatures, but calf skin temperature was significantly ($P<0.05$) lower during arm crank than cycle exercise. During the relative intensity experiments, thermoregulatory responses were lower during arm crank than cycle exercise. These results indicated that the examined thermoregulatory responses are independent of the skeletal muscle mass employed and dependent upon the absolute metabolic intensity. Author (GRA)

N83-32299# Army Research Inst. of Environmental Medicine, Natick, Mass. Heat Research Div.
HYPOHYDRATION AND ACCLIMATION: EFFECTS ON HORMONE RESPONSES TO EXERCISE/HEAT STRESS
Ralph P. Francesconi, Michael N. Sawka, and Kent B. Pandolf 15 Mar. 1983 24 p refs
(DA Proj. 3M1-61101-BS-10)
(AD-A127855; USARIEM-M-16/83) Avail: NTIS HC A02/MF A01 CSCL 06/19

This study was designed to assess the effects of hypohydration (-5% body weight) and heat acclimation on plasma cortisol and growth hormone responses to exercise (1.34 m/sec -1) in a thermoneutral (20 C, 40% rh), hot-wet (35 C, 79% rh), or hot-dry (49 degrees C, 20% rh) environment. Exercise*in a thermoneutral environment while euhydrated resulted in significant ($p<.05$) decrements in plasma cortisol (PC); however, when hypohydrated, PC levels were significantly ($p<.02$) elevated. Acclimation attenuated the PC elevations elicited by hypohydration. Hypohydration also effected significant ($p<.02$) increases in growth hormone (GH) in the thermoneutral environment. Exercise in a hot-wet or hot-dry environment resulted in significant ($p<.05$) increments in both hormones when hypohydrated; these effects were, in several instances, attenuated ($p<.05$) by acclimation, particularly in the hot-wet environment. We concluded that the PC and GH responses were amplified when subjects were hypohydrated and, in several instances, these responses were attenuated by heat acclimation. Additionally, our data indicated that gender does not affect the direction or intensity of these hormonal responses. GRA

N83-32300# Army Research Inst. of Environmental Medicine, Natick, Mass.
A MODEL OF HEAT LOSS AND THERMOREGULATION FOR IMMERSION IN COLD WATER
Louis H. Strong and Ralph F. Goldman Apr. 1983 32 p refs
(DA Proj. 3E1-62777-A-879)
(AD-A127854; USARIEM-M-19/83) Avail: NTIS HC A03/MF A01 CSCL 06/19

Twenty male subjects (17 to 28 yrs of age) exhibiting a range of body weights (60 kg < or = Wt < or = 95 kg) and body fat (7% < or = BF < or = 23%) underwent total immersion while at rest in water between 36 C and 20 C. The time course of mean skin (T sub sk) and rectal (T sub re) temperatures as well as surface heat flow was simulated for each individual immersion with the aid of a time dependent system of differential, heat balance equations coupling different body compartments and the epithelium to the water bath. Metabolic heat production for each immersion (supplied as functions of T sub re and T sub sk minus 8% of the instantaneous value to account for respiratory losses) were used as heat source terms. This formulation permitted the evaluation of internal and external conductances as a function of water temperature. Analysis showed that cardiovascular compensation occurs at higher bath temperatures for small, lean men compared to large, fatter men. It also showed that body size (expressed as the ratio of mass to surface area) in addition to fat content controls the maximal internal insulation as well as the rate of decline of T sub re. GRA

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N83-32301*# San Jose State Univ., Calif. Dept. of Chemistry.
THE EFFECTS OF CO AND HCN ON POLE-JUMP AVOIDANCE-ESCAPE BEHAVIOR
William Winslow Aug. 1981 120 p refs
(Contract NCC2-4)
(NASA-CR-166512; NAS 1.26:166512) Avail: NTIS HC A06/MF A01 CSCL 06C

The effects of carbon monoxide and mixtures of carbon monoxide and hydrogen cyanide at different concentrations and times of exposure were studied in a pole-jump apparatus. The time to loose the avoidance and escape response for mice exposed to these atmospheres was obtained. Correlations to predict the loss as a function of dosage are presented. Author

N83-32302*# San Jose State Univ., Calif. Dept. of Chemistry.
RISK ESTIMATES FOR CO EXPOSURE IN MAN BASED ON BEHAVIORAL AND PHYSIOLOGICAL RESPONSES IN RODENTS

Mary K. Gross Dec. 1983 136 p refs
(Contract NCC2-4)
(NASA-CR-166513; NAS 1.26:166513) Avail: NTIS HC A07/MF A01 CSCL 06C

An examination of animal response to CO is studied along with potential models for extrapolating animal test data to humans. The best models for extrapolating data were found to be the Probit and Weibull models. Author

N83-32303# Seville Research Corp., Pensacola, Fla.
PRIVATE PILOT FLIGHT SKILL RETENTION 8, 16 AND 24 MONTHS FOLLOWING CERTIFICATION Final Report, Jan. 1981 - Jun. 1983
Jerry M. Childs, William D. Spears, and Wallace W. Prophet Atlantic City, N.J. FAA Jul. 1983 116 p refs
(Contract DOT-FA79NA-6040)
(DOT/FAA/CT-83/34; SEVILLE-TR-83-17) Avail: NTIS HC A06/MF A01

Results are summarized for flight skill retention checks conducted 8, 16, and 24 months following private pilot certification. Proficiency loss was documented for all subjects and for each flight task studies, and the losses were statistically significant in nearly all cases. Tasks that were relatively high, low, and more rapid in skill loss were identified, and the effects of interpolated training on skill loss patterns were assessed. Pilots' ability to predict and evaluate their own skill retention levels for specific flight tasks was negligible. The present findings suggest that effective continuation training program and media are needed, especially to address cognitive types of flight skills. Several such potential media are described. Author

N83-32304# Naval Aerospace Medical Research Lab., Pensacola, Fla.
PRELIMINARY EVALUATION OF TWO DICHOTIC LISTENING TASKS AS PREDICTORS OF PERFORMANCE IN NAVAL AVIATION UNDERGRADUATE PILOT TRAINING
Glenn R. Griffin and James D. Mosko 23 Jul. 1982 22 p refs
(ZF51524002; M0096PN001)
(AD-A127337; NAMRL-1287) Avail: NTIS HC A02/MF A01 CSCL 05/10

Aircraft pilots must divide their attention among a wide range of auditory inputs. Dichotic listening tasks (DLTs) have been proposed to assess selective attention performance and to predict the probability of success of aviation candidates in flight training programs. A preliminary evaluation has been conducted of two dichotic listening tasks on a subject population about to enter the Naval Aviation Undergraduate Pilot Training Program. This report presents the results of that evaluation, describes the statistical properties of the two DLTs, and presents estimates of their utility as predictors of human performance in Naval Aviation Undergraduate Pilot Training. Results indicate that both DLTs are reliable and are unrelated to present selection tests. One DLT was significantly related to the successful completion of Naval Aviation Undergraduate Pilot Training. Future research should investigate the behavioral constructs being measured by the DLTs. Is selective attention, auditory vigilance, motivation, or speech intelligibility being measured? In addition, a comparison of DLTs utilizing both natural and synthetic speech should be undertaken to determine the effect of vocal quality on DLT performance.
Author (GRA)

N83-32305# Arizona Univ., Tucson. Dept. of Psychology.
THE ROLE OF A MENTAL MODEL IN LEARNING TO OPERATE A DEVICE
David E. Kieras and Susan Bovair 1 Mar. 1983 59 p
(Contract N00014-81-C-0699; RR0420602)
(AD-A127281; UARZ/DP/TR-83/ONR-13) Avail: NTIS HC A04/MF A01 CSCL 05/10

This report presents two studies concerned with learning how to operate a simple control panel device, and how this learning is affected by understanding the internal structure of the device, which is a device model for the device. The first experiment compared two groups, one of which learned a set of operating procedures for the device by rote, and the other learned the device model before receiving the identical procedure training. The model group learned the procedures faster, and even after one week, retrained them better and executed them faster; a typical effect size is a 20% improvement. Furthermore, the model group could simplify, or make more efficient, the procedures far more often then the rote group. The second study examined the hypothesis that the improvement is due to the model group being able to infer the procedures, which would lead to more rapid learning and better recall performance. The same group manipulation was used, but subjects inferred the procedures rather than learning them, and thought out loud while doing so. The model group based their reasoning on direct inferences from the device model, and inferred the correct procedures in almost the minimum amount of time. GRA

N83-32306# Johns Hopkins Univ., Baltimore, Md. Div. of Behavioral Biology.
SMALL GROUPS PROGRAMMED ENVIRONMENTS: BEHAVIORAL AND BIOLOGICAL INTERACTIONS
Henry H. Emurian and Joseph V. Brady 1 Apr. 1983 43 p refs
(Grant NGR-21-001-111; Contract N00014-80-C-0467)
(NASA-CR-172853; NAS 1.26:172853; AD-A127172; ONR-TR-8)
Avail: NTIS HC A03/MF A01 CSCL 05J

This report reviews a research program undertaken within a laboratory environment that was designed and constructed to support behavior analyses of individual and group performance effectiveness viewed conceptually within the context of a small-scale human microsociety. Summarized are previous research emphases and findings in relationship to: (1) conditions that sustain group cohesion and productivity and that prevent social fragmentation and performance deterioration; (2) motivational effects resulting from the programmed consequences of individual and group performance requirements; and (3) behavioral and biological effects resulting from a change in group size. A more detailed description is presented of the results of a recent series of experiments that were conducted to assess performance and hormonal effects of replacing an established group participant with a novitiate member. The significance of these investigative undertakings is to be understood in terms of emergent environmental, motivational, and behavioral-biological principles having practical relevance for the establishment and maintenance of small-scale human social systems. GRA

N83-32307# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Psychology.
EXCEPTIONAL MEMORY
K. Anders Ericsson and William G. Chase Nov. 1982 22 p refs
(Contract N00014-81-C-0335)
(AD-A126977; TR-8-ONR) Avail: NTIS HC A02/MF A01 CSCL 05/10

There are scientific records of memory feats that deviate so markedly from the normal that they are called exceptional and are assumed to reflect a memory system structurally different from that of most people. Some recent research involving memory training of normal people has led us to question this distinction. We will first describe the empirical evidence reported in support of the idea that exceptional memory is different from normal memory. Then we will present our research in support of the assertion that normal memory structure is sufficient to explain exceptional memory feats, if we take into account differences in practice and prior experience. GRA

N83-32308# Advanced Information and Decision Systems, Mountain View, Calif.
OPTION GENERATION TECHNIQUES FOR COMMAND AND CONTROL Final Technical Report, 15 May 1981 - 9 Aug. 1982
R. M. Tong, A. Arbel, S. O. Cioffi, C. M. Kelley, and J. R. Payne Jan. 1983 190 p refs
(Contract F30602-81-C-0178)
(AD-A127715; RADC-TR-83-6) Avail: NTIS HC A09/MF A01 CSCL 05/10

The research described in this report explores the problem of option generation for open decision problems. Part of the effort has been to define the problem of option generation and what it means to aid the decision maker in this task, and part has been to define and use procedures for experimentally evaluating our ideas. The result of the effort is a generic model of option generation with specific recommendations for option aiding tools.
Author (GRA)

N83-32309# Naval Health Research Center, San Diego, Calif.
PSYCHOPHARMACOLOGICAL TECHNIQUES FOR OPTIMIZING HUMAN PERFORMANCES Interim Report, Aug. 1978 - Mar. 1983
Cheryl L. Spinweber and Laverna C. Johnson 22 Mar. 1983 18 p refs
(MR0000101; MR04101003)
(AD-A128529; NAVHLTHRSCHC-83-11) Avail: NTIS HC A02/MF A01 CSCL 06/15

In operational environments, administration of psychopharmacological agents could be employed to optimize and maintain human performance. One technique of considerable military importance is use of sleeping aids to promote rapid sleep onset and permit efficient utilization of rest periods. A methodology for evaluation of sleeping aids for military use is described. In laboratory study of the triazolobenzodiazepine triazolam 0/5 mg, sleep latency was reduced and morning performance was unimpaired, although a clear performance decrement was present up to 5 hours post-administration. Triazolam also produced anterograde amnesia and elevated auditory threshold for arousal from sleep. In operational use, triazolam could be effectively administered when rest periods of 8 hours duration are scheduled. The dietary amino acid 1-tryptophan 4 g was effective in reducing daytime sleep latency in normal sleepers, suggesting its usefulness in alleviating sleep disturbances associated with jet lag and altered work-rest schedules. In nighttime administration to chronic poor sleepers, 1-tryptophan 3 g reduced sleep latency after three nights of administration and had no adverse performance effects. The suitability of both triazolam and 1-tryptophan for military use will be further evaluated in field research and tested in operational environments. Another psychopharmacological approach is administration of carefully-chosen stimulants to maintain alertness and performance effectiveness when there is no opportunity for sleep. The techniques developed in this on-going research program in behavioral psychopharmacology will be employed to evaluate stimulants for operational use. GRA

N83-32310# Purdue Univ., Lafayette, Ind. Dept. of Psychological Sciences.
EFFECTS OF STANDARD EXTREMITY ON MIXED STANDARD SCALE PERFORMANCE RATINGS Interim Report
Janet L. Barnes-Farrell and Howard M. Weiss Mar. 1983 38 p refs
(Contract N00014-82-K-0449; NR Proj. 170-940; RR0420801)
(AD-A128645; REPT-83-2) Avail: NTIS HC A03/MF A01 CSCL 05/10

It was suggested that the extremity of the scale values associated with standards used to represent effective and ineffective performance in Mixed Standard Scales may affect the nature of performance ratings derived from MSS responses and decisions based on MSS ratings. When the extremity of standards was experimentally manipulated, it was found that standard extremity affects both the level of performance ratings and the proportion of logically inconsistent response patterns observed. In addition, standard extremity appears to affect the rankings on performance of ratees. The implications of these observations for the development of Mixed Standard Scales were discussed.
Author (GRA)

N83-32311# Purdue Univ., Lafayette, Ind. Dept. of Psychological Sciences.
METHODOLOGICAL CONTRIBUTIONS OF PERSON PERCEPTION TO PERFORMANCE APPRAISAL Interim Report
Daniel R. Ilgen and Janet L. Favero Mar. 1983 42 p refs
(Contract N00014-82-K-0449; NR Proj. 170-940; RR0420801)
(AD-A128638; Rept-83-4) Avail: NTIS HC A03/MF A01 CSCL 05/9

A process focus on performance appraisal represents the application of knowledge about the information processing capabilities of individuals to the problem of appraising the work performance of employees. Much of our attempt to understand the appraisal process has borrowed from social psychology in general and person perception in particular. Although the theoretical constructs of person perception have appeared to be very relevant to performance appraisal, the experimental methods from which the data related to the theoretical constructs have been generated may be less well suited for studying particular issues in performance appraisal. In this paper, we outline several of the methods used in person perception and then discuss the relevance of these methods for studying performance appraisal. In order to accomplish this final critique of the methods, we first outline the nature of the performance appraisal process with its conditions and constraints that affect the relevance of data collected with respect to the process.
Author (GRA)

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N83-32312# General Accounting Office, Washington, D. C. National Productivity Group.
AUTOMATION IN THE WORKPLACE, ITS IMPACT ON THE LABOR FORCE, AND THE ROLE OF LABOR MARKET PLANNING FOR POLICYMAKING
Brian L. Usilaner 6 Aug. 1983 18 p ref
Avail: NTIS HC A02/MF A01

The importance of automation of productivity and the economy, barriers, and stimulators of automation, potential impact on the work force, and difficulties in accurate labor market planning are discussed.
Author

N83-32313# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
DYNAMIC SCALING OF MANIPULATOR TRAJECTORIES
John M. Hollerbach Jan. 1983 14 p refs
(Contracts N00014-80-C-0505; N00014-82-K-0334)
(AD-A127074; AI-M-700) Avail: NTIS HC A02/MF A01 CSCL 12/1

A fundamental time-scaling property of manipulator dynamics has been identified that allows modification of movement speed without complete dynamics recalculation. By exploiting this property, it can be determined whether a planned trajectory is dynamically realizable given actuator torque limits, and if not, how to modify the trajectory to bring it within dynamic and actuating constraints.
Author (GRA)

N83-32314# Naval Postgraduate School, Monterey, Calif. Dept. of Operations Research.
INTEGRATION ANALYSIS: A PROPOSED INTEGRATION OF TEST AND EVALUATION TECHNIQUES FOR EARLY ON DETECTION OF HUMAN FACTORS ENGINEERING DISCREPANCIES M.S. Thesis
David Leo Carlson Mar. 1983 83 p refs
(AD-A127611) Avail: NTIS HC A05/MF A01 CSCL 05/5

The objective of this thesis is to address the idea of implementing a viable T&E technique at the early stages of DT&E in order to reduce design discrepancies and minimize acquisition costs and time. This technique involves integration of Task Analysis, Operator Interviews and Link Analysis to evaluate a system's Functional Mock-up. The technique will, therefore, be referred to as Integration Analysis throughout the paper. In order to provide a measure of its contribution, it will be implemented on a recently procured system that experienced numerous HFE

design discrepancies at its OT&E stage. The system in question, the Recovery Assist, Securing, and Traversing (RAST) System associated with the LAMPS MK III Acquisition, revealed HFE problems in relation to its LSO Control Station. The use of the subject technique could have discovered a majority of those problems much earlier in the Acquisition Process. GRA

N83-32315# Naval Submarine Medical Research Lab., Groton, Conn.
COLD WEATHER GOGGLES. PART 5: ACCEPTABLE LIMITS OF OPTICAL DISTORTION Interim Report
S. M. Luria and Roberto Rodriguez 11 Apr. 1983 18 p refs (MO095001)
(AD-A127657; NSMRL-998) Avail: NTIS HC A02/MF A01 CSCL 06/17

Contrast sensitivity, acuity through binoculars, depth perception, and riflery were measured as subjects looked through goggles with various degrees of optical distortion. The amount of distortion necessary to produce a statistically significant degradation of performance was determined for each task in order to specify the maximum allowable optical distortion in goggles. The degree of distortion was quantified by projecting a Snellen chart through the goggles and determining the Snellen line which could then be read. By this criterion, the maximum permissible distortion is that which degrades acuity from 20/20 to the 20/30 line.Author (GRA)

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N83-32316# Mathematisch Centrum, Amsterdam (Netherlands).
FROM A TO Z: PROCEEDINGS OF A SYMPOSIUM IN HONOUR OF A. C. ZAANEN
C. B. Huijsmans, ed., M. A. Kaashoek, ed., W. A. J. Luxemburg, ed., and W. K. Vietsch, ed. 1982 132 p refs Symp. held in Leiden, 5-6 Jul. 1982 Sponsored by Netherlands Organization for the Advancement of Pure Research
(MATH-CENTRE-TRACTS-149; ISBN-90-6196-241-2) Avail: NTIS HC A07/MF A01

Various topics in functional analysis, integration theory, and related areas are addressed including orthomorphisms, Banach spaces and lattices, compact and integral operators, Riesz spaces, and positive groups and semi-groups. For individual titles, see N83-32317 through N83-32328.

N83-32317# Mathematisch Centrum, Amsterdam (Netherlands).
ORLICZ SPACES: A SURVEY OF CERTAIN ASPECTS c67
J. J. Grobler From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 1-12 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

Some basic facts concerning Orlicz spaces are presented and recent developments are surveyed. The properties of linear functionals on these spaces are discussed. Space structure and representation are reviewed along with indices for Orlicz spaces. Finally, some applications are outlined. M.G.

N83-32318# Mathematisch Centrum, Amsterdam (Netherlands).
ORTHOMORPHISMS c67
C. B. Huijsmans From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 13-20 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

Orthomorphisms and some associated theorems are described. A definition is given which states that the order bounded linear mapping pi from the Riesz space L into itself is called an orthomorphism if it follows from f being perpendicular to g in L that pi f is perpendicular to g. The order bounded linear mapping pi is an orthomorphism if and only if pi leaves all bands invariant (i.e., pi is so-called band preserving). Any positive orthmorphism on L is evidently a lattice homomorphism. Further, it is shown that the set of all orthomorphisms on a Riesz space is an Archimedean f-algebra with unit element. The theory of orthomorphisms is used to prove the theorem stating that any Archimedean f-algebra is commutative. M.G.

N83-32319# Mathematisch Centrum, Amsterdam (Netherlands).
EMBEDDINGS OF RIESZ SUBSPACES WITH AN APPLICATION TO MATHEMATICAL STATISTICS c65
E. deJonge From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 21-26 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

Subspaces of an Archimedean Riesz space which are regular and/or normal are discussed. A theorem is presented which demonstrates that the image of a strictly positive projection is a Riesz subspace which is nicely embedded. By way of an example it is shown how such projections occur in mathematical statistics. Applications to sufficient sigma-algebras are examined. M.G.

N83-32320# Mathematisch Centrum, Amsterdam (Netherlands).
SYMMETRISABLE OPERATORS AND MINIMAL FACTORIZATION c64
M. A. Kaashoek From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 27-38 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

The use of symmetrisable operators in the minimal factorization of non-negative rational matrix functions is discussed. The results concern symmetrisable operators acting on finite dimensional spaces. M.G.

N83-32321# Mathematisch Centrum, Amsterdam (Netherlands).
ORTHOMORPHISMS AND THE RADON-NIKODYM THEOREM REVISITED c67
W. A. J. Luxemburg From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 39-50 Sponsored in part by NSF (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

The f-algebras of orthomorphisms of abstract L-spaces are discussed. A theorem is proved which states that if (L, parallel. parallel) is an abstract L-space in the sense of Kakutani, then Orth(L), the f-algebra of its orthomorphisms, is isomorphic with M, the dual space of L. This theorem is then used to prove a general Radon-Nikodym type theorem for general measures. M.G.

N83-32322# Mathematisch Centrum, Amsterdam (Netherlands).
ON THE RADON-NIKODYM THEOREM c67
P. Maritz From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 51-60 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

Aspects of the Radon-Nikodym theorem and the Radon-Nikodym property (RNP) are discussed. In particular, the geometric and measure theoretic properties of the RNP for a Banach space are examined. Ranges of measures and multifunctions are also addressed. M.G.

N83-32323# Mathematisch Centrum, Amsterdam (Netherlands).
DUALITY IN THE THEORY OF BANACH LATTICES c67
B. dePagter From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 61-67 refs Sponsored by Netherlands Organization for Advancement of Pure Research (For primary document see N83-32316 20-59)

Avail: NTIS HC A07/MF A01

The concept of duality plays an important role in the theory of normed linear spaces, especially the embedding of a normed linear space in its second dual and the reflexivity of such a space. In a series of papers Luxemburg and Zaanen discussed these and related problems for normed Riesz space extensively. A survey of their contributions to this part of the theory of normed Riesz spaces is given, with the discussion restricted to Banach lattices. M.G.

N83-32324# Mathematisch Centrum, Amsterdam (Netherlands).
SOME RECENT RESULTS ON POSITIVE GROUPS AND SEMI-GROUPS **c67**
H. H. Schaefer From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 69-79 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

Applications of the spectral theory of positive operators (or equivalently, of discrete monothetic semi-groups) to the normed structures of groups of positive operators on an arbitrary Banach lattice are addressed. The extension of that theory to strongly continuous one parameter semi-groups of positive operators is also discussed. M.G.

N83-32325# Mathematisch Centrum, Amsterdam (Netherlands).
INTEGRAL OPERATORS **c64**
A. R. Schep From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 81-91 refs Sponsored in part by the South Carolina Univ. Research and Productive Scholarship Fund (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

Properties of linear (non-singular) integral operators are discussed. The order structure of order rounded integral operators and the compactness properties of integral operators are examined. Also, the relation between integral operators and multiplication operators is addressed. M.G.

N83-32326# Mathematisch Centrum, Amsterdam (Netherlands).
THE BACKGROUND TO CAUCHY'S DEFINITION OF THE INTEGRAL **c64**
F. Smithies From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 93-100 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

The historical background to Cauchy's definition of the integral and what his new definition achieved are discussed. Notation for definite integrals is also addressed. M.G.

N83-32327# Mathematisch Centrum, Amsterdam (Netherlands).
SOME LATTICE PROPERTIES OF THE SPACE L2 **c67**
B. Sz.-Nagy From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 101-112 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

Possible connections between the metric structure of abstract Hilbert space and the additional vector lattice structure of the classical, functional Hilbert space L(2) are investigated. M.G.

N83-32328# Mathematisch Centrum, Amsterdam (Netherlands).
COMPACT OPERATORS **c64**
W. K. Vietsch From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 113-121 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

A general exposition of the theory of compact operators is presented emphasizing the contributions of Zaanen. Compact kernel operators, compactness in measure, compact operators on Banach lattices, and indices are covered. M.G.

N83-32329# Grenoble Univ. (France).
ANNALS OF THE FOURIER INSTITUTE, VOLUME 33, NUMBER 1 [ANNALES DE L'INSTITUT FOURIER]
L. BoutetDeMonvel, ed., P. Cartier, ed., Y. ColinDeVerdiere, ed., C. Godbillon, ed., I. Kupka, ed., B. Malgrange, ed., J. Martinet, ed., V. Poenaru, ed., N. Varopoulos, ed., and B. Malgrange, ed. 1983 313 p refs In ENGLISH and FRENCH
(ISSN-0373-0956) Avail: NTIS HC A14/MF A01

Various topics in algebraic topology, group theory, analytic functions and spaces, and differential equations are addressed. For individual titles, see N83-32330 through N83-32340.

N83-32330# Grenoble Univ. (France).
INVARIANTS OF A MAXIMAL UNIPOTENT SUBGROUP OF A SEMI-SIMPLE GROUP [INVARIANTS D'UN SOUS-GROUPE UNIPOTENT MAXIMAL D'UN GROUPE SEMI-SIMPLE] **c64**
Michel Brion *In its* Ann. of the Fourier Inst., v. 33, no. 1 1983 p 1-27 refs In FRENCH; ENGLISH summary (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

Let G be an algebraic complex semi-simple group, with a maximal unipotent subgroup U and a maximal torus T normalizing U. If V is a rational finite-dimensional G-module, then G acts on the algebra C[V] of polynomial functions on V, and the G-structure of C[V] is described by the T-algebra C[V](U) of U-invariant functions. This algebra is finitely generated and multigraded (by the degree of C[V] and weight w.r.t. T). The Poincare series of C[V] for this grading is given by an integral formula and, e.g., it happens that for most V, f(z(-1))=(-1)(dim V-dim U) z (dim V) f(z) when f is the Poincare series of C[V] graded by the degree of C[V]. For a simple G, the irreducible G-modules V such that C[V] is regular are classified; in these G-modules, every closure of a G-orbit has rational singularities. A result similar to the Hilbert-Mumford criterion is also proved for U-invariants. Author

N83-32331# Groningen Rijksuniversiteit (Netherlands). Mathematisch Inst.
ETALE COVERING OF A MUMFORD CURVE **c67**
Marius vanderPut *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33 no. 1 1983 p 29-52 refs (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

Let the field K be complete w.r.t. a non-archimedean valuation. Let X/K be a Mumford curve, i.e., the irreducible components of the stable reduction of X have genus 0. The abelian etale coverings of X are constructed using the analytic uniformization omega approaches X and the theta-functions on X. For a local field K one rediscovers G. Frey's description of the maximal abelian unramified extension of the field of rational functions of X. Author

N83-32332# Pisa Univ. (Italy). Inst. de Matematica.
THE THEOREM OF SEMI-PROPER COMPLEXIFICATION [LE THEOREME DE COMPLEXIFICATION SEMI-PROPRE] **c64**
E. Fortuna and M. Galbiati *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 53-65 refs In FRENCH; ENGLISH summary (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

It is well-known that the image of a complex analytic semi-proper map is an analytic set; in he real case, the image is, in general, subanalytic. A condition for the semi-analyticity of the image of a real analytic semi-proper map which has a semi-proper complexification is found. Author

N83-32333# California Univ., Los Angeles. Dept. of Mathematics.
THE SMALLEST SUPERHARMONIC MAJORANT AND ITS RELATION TO THE EXISTENCE OF ENTIRE FUNCTIONS OF THE EXPONENTIAL TYPE PLAYING THE ROLE OF MULTIPLIER [LA PLUS PETITE MAJORANTE SURHARMONIQUE ET SON RAPPORT AVEC L'EXISTENCE DES FONCTIONS ENTIERES DE TYPE EXPONENTIEL JOUANT LE ROLE DE MULTIPLICATEURS] **c67**
Paul Koosis *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 67-107 refs In FRENCH; ENGLISH summary (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

For an even continuous function w(x) > or = 0 we are interested in the possible existence of entire functions phi(z) is not identically equal to 0 of exponential type a making phi(x) exp

w(x) bounded on the real axis. If w(x) has some mild regularity, the existence of such a phi is equivalent to that of an increasing function p(t) on (0, infinity) with p(t)=theat(t), p(t)/t approaches a/pi for t approaching infinity, and w(x) + integral (infinity to 0) log absolute value (1-x squared/t squared) Dp(t)< or = const, x being an element of R. It is shown that the existence of such a p is equivalent to that of a superharmonic majorant on C for the function 1/pi integral (infinity to-infinity) absolute value lz/absolute value (z-t) squared w(t)dt-a absolute value lz, that superharmonic majorant being finite in at least on point of C. This result is used to give a new proof of the Beurling-Malliavin multiplier theorem and to obtain a quantitative version of the latter. M.G.

N83-32334# Paris-Sud Univ., Orsay (France). Dept. of Mathematiques.
SYSTEMS OF DIFFERENCE-DIFFERENTIAL EQUATIONS [SUR LES SYSTEMS D'EQUATIONS DIFFERENCE-DIFFERENTIELLES] c64
C. A. Berenstein, B. A. Taylor (Michigan Univ., Ann Arbor), and A. Yger (Ecole Polytechnique) *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 109-130 refs In FRENCH; ENGLISH summary (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

Given a system (S) of two difference-differential equations with constant coefficients in R(2), whose delays are commensurable, say (S): Mu(1)*F=Mu(2)*F=0, if the system is not redundant (i.e., V=[Mu(1)=Mu(2)= 0] is discrete in C squared), every C(infinity) solution of the system admits a representation F(x) = sigma a sub gamma(x) E(i/gamma, x/), where gamma is an element of V, A sub gamma is an element of C[x(1), x(2)], and a sub gamma (x) e(i/gamma, x/) is also a solution of the system (s). Moreover, the series is convergent in E(R(2)) after a grouping of terms independent of the solution F. Author

N83-32335# Jochi Univ., Tokyo (Japan). Dept. of Mathematics.
CHARACTERISTIC CAUCHY PROBLEMS AND SOLUTIONS OF FORMAL POWER SERIES c64
Sunao Ouchi *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 131-176 refs (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

Let L(z, d sub z)=(d sub z sub 0)(k)-A(z, d sub z) be a linear partial differential operator with holomorphic coefficients, where A(z, d sub z)=Sigma (k-1/j=0) A sub j(z, d sub z')(d sub 0)(j), ord. A(z, d sub z)=m>k, z=(z sub 0, z') is an element of C(n+1). A Cauchy problem is considered with holomorphic data L9z, d sub z) u(z)=f(z), (d sub z sub 0)(i) u(o, z') (0<or=i<or=k-1). A formal solution is easily obtained, but in general it diverges. It is shown under some conditions that for any sector S with the opening less than a constant determined by L9z, sub o), there is a function u sub s(z) holomorphic except on (z sub o = o) such that L(z, d sub z) u sub s(z)=f(z) and u sub s(z) is approximately u(z) as z sub 0 approaches 0 in S. M.G.

N83-32336# Kyoto Univ. (Japan). Dept. of Mathematics.
ON CONDITION (A SUB F) OF A STRATIFIED MAPPING c64
Satoshi Koike *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 185-194 refs (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

For a stratified mapping f, the condition (s sub f) concerning the kernel of the differential of f is considered. It is shown that the condition (a sub f) is equivalent to the condition (a sub f (s)) which has a more obvious geometric content. M.G.

N83-32337# Dijon Univ. (France). Lab. de Topologie.
THE DENSITY OF THE LEAVES OF CERTAIN PFAFF EQUATIONS WITH TWO VARIABLES [DENSITE DES FEUILLES DE CERTAINES EQUATIONS DE PFAFF A 2 VARIABLES] c64
Dominique Cerveau *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 185-194 refs In FRENCH; ENGLISH summary (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

Generic sufficient conditions are given which insure the density of the leaves of Pfaffian forms in C(2). Local and global situations are studied. Author

N83-32338# Limburgs Univ., Diepenbeek (Belgium).
THE GERMS OF DIFFEOMORPHISMS AND OF VECTOR FIELDS IN THE CLASS OF FINITE DIFFERENTIALABILITY c67
F. Dumortier and R. Roussarie (Dijon Univ.) *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 195-267 refs (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

For each triple of integers s,k,l, with o< or = s< or = k, there is the question of the germs of C(e) diffeomorphisms or vector fields, on R(n) which are k-determined in class C(s), i.e., which are respectively C(s)-conjugated or equivalent to every C(e)-germ with the same k-jet. This problem is handled in some generality for dimension 2, and also for codimension 2 germs of vectors fields, in dimension 3 and 4. As a consequence of this last study the existence of a filtration of the space of germs of vector fields in R(n) is obtained up to codimension 2, for topological equivalence and not only for the weak topological equivalence as precedently established by F. Takens. Author

N83-32339# National Inst. for Scientific and Technical Creation, Bucharest (Romania). Dept. of Mathematics.
DEGREE OF THE FIBERS OF AN ELLIPTIC FIBRATION c64
Alexandru Buium *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 269-276 refs (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

Let X approaches B be an elliptic fibration with general fiber F. Let n(e), n(s), n(a), n(v) be the minima of the non-zero intersection numbers (L.F) where L runs successively through the following sets: effective divisors on X, invertible sheaves spanned by global sections, ample divisors and very ample divisors. Let m be the maximum of the multiplicities of the fibers of X approaches B. It is proved that n(e) = n(s) if and only if n(e) > or = 2m and that n(a) = n(u) if and only if n(a) > or = 3m. M.G.

N83-32340# Pasteur (Louis) Univ., Strasbourg (West Germany). Inst. de Recherche Mathematique Avancee.
FIBER COBORDISM AND APPROXIMATION OF A SINGULAR SUBMANIFOLD BY C(INFINITY) [COBORDISME FIBRE ET APPROXIMATION D'UNE SOUS-VARIETE SINGULIERE PAR DER SOUS-VARIETES C INFINITE] c64
Andre Didierjean *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 277-306 refs In FRENCH; ENGLISH summary (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

It is shown that the cobordism of maps and the fiber cobordism give the topological obstructions to smoothing singularities of submanifolds. Groups of fiber cobordism in low dimension are calculated. Results on the fiber cobordism give the calculation of obstructions to this smoothing. Author

N83-32341*# Bowling Green State Univ., Ohio. Dept. of computer Science.
PERTURBATION ANALYSIS OF THE LIMIT CYCLE OF THE FREE VAN DER POL EQUATION Final Report
Mohammad B. Dadfar, James Geer (SUNY, Binghamton), and Carl M. Anderson (Coll. of William and Mary, Williamsburg, Va.) Jun. 1983 33 p refs
(Contracts NAS1-14101; ET-78-C-02-4687; N00014-77-C-0641; F49620-79-C-0020)
(NASA-CR-172166; ICASE-83-30; NAS 1.26:172166) Avail: NTIS HC A03/MF A01 CSCL 12A

A power series expansion in the damping parameter, epsilon, of the limit cycle of the free van der Pol equation is constructed and analyzed. Coefficients in the expansion are computed in exact rational arithmetic using the symbolic manipulation system MACSYMA and using a FORTRAN program. The series is analyzed using Pade approximants. The convergence of the series for the maximum amplitude of the limit cycle is limited by two pair of

complex conjugate singularities in the complex epsilon-plane. A new expansion parameter is introduced which maps these singularities to infinity and leads to a new expansion for the amplitude which converges for all real values of epsilon. Amplitudes computed from this transformed series agree very well with reported numerical and asymptotic results. For the limit cycle itself, convergence of the series expansion is limited by three pair of complex conjugate branch point singularities. Two pair remain fixed throughout the cycle, and correspond to the singularities found in the maximum amplitude series, while the third pair moves in the epsilon-plane as a function of t from one of the fixed pairs to the other. The limit cycle series is transformed using a new expansion parameter, which leads to a new series that converges for larger values of epsilon. Author

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering.*

N83-32342* National Aeronautics and Space Administration. Pasadena Office, Calif.

DISTRIBUTED MULTIPORT MEMORY ARCHITECTURE Patent

Wayne H. Kohl, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 19 Jul. 1983 11 p Filed 29 Apr. 1981 Supersedes N83-18290 (21 - 08, p 1246) Sponsored by NASA (NASA-Case-NPO-15342-1; US-Patent-4,394,726; US-Patent-Appl-SN-258623; US-Patent-Class-364-200; US-Patent-Class-364-900) Avail: US Patent and Trademark Office CSCL 09B

A multiport memory architecture is diclosed for each of a plurality of task centers connected to a command and data bus. Each task center, includes a memory and a plurality of devices which request direct memory access as needed. The memory includes an internal data bus and an internal address bus to which the devices are connected, and direct timing and control logic comprised of a 10-state ring counter for allocating memory devices by enabling AND gates connected to the request signal lines of the devices. The outputs of AND gates connected to the same device are combined by OR gates to form an acknowledgement signal that enables the devices to address the memory during the next clock period. The length of the ring counter may be effectively lengthened to any multiple of ten to allow for more direct memory access intervals in one repetitive sequence. One device is a network bus adapter which serially shifts onto the command and data bus, a data word (8 bits plus control and parity bits) during the next ten direct memory access intervals after it has been granted access. The NBA is therefore allocated only one access in every ten intervals, which is a predermined interval for all centers. The ring counters of all centers are periodically synchronized by DMA SYNC signal to assure that all NBAs be able to function in synchronism for data transfer from one center to another.

Official Gazette of the U.S. Patent and Trademark Office

N83-32343# Committee on Science and Technology (U. S. House).

MEASURES TO ADDRESS THE IMPACT OF COMPUTER TECHNOLOGY ON LESSER DEVELOPED COUNTRIES

Washington GPO 1982 191 p refs Hearings before the Comm. on Sci. and Technol., 97th Congr., 2d Sess., No. 137, 19 May and 15 Jul. 1982

(GPO-99-819) Avail: Subcomm. on Invest. and Oversight

The transfer of communications technology to underdeveloped countries is addressed. Author

N83-32344*# Mississippi State Univ., Mississippi State. Dept. of Electrical Engineering.

SYSTEM ANALYSIS FOR THE HUNTSVILLE OPERATIONAL SUPPORT CENTER DISTRIBUTED COMPUTER SYSTEM Annual Report, May 1982 - Jun. 1983

E. M. Ingels Jul. 1983 106 p refs

(Contract NAS8-34906)

(NASA-CR-170840; NAS 1.26:170840; MSSU-EIRS-EE-83-6) Avail: NTIS HC A06/MF A01 CSCL 09B

A simulation model was developed and programmed in three languages BASIC, PASCAL, and SLAM. Two of the programs are included in this report, the BASIC and the PASCAL language programs. SLAM is not supported by NASA/MSFC facilities and hence was not included. The statistical comparison of simulations of the same HOSC system configurations are in good agreement and are in agreement with the operational statistics of HOSC that were obtained. Three variations of the most recent HOSC configuration was run and some conclusions drawn as to the system performance under these variations. Author

N83-32345# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A STUDY OF COMPUTER-AIDED GEOMETRIC OPTICAL DESIGN M.S. Thesis

Michael J. Wahlstedt Oct. 1982 66 p refs

(AD-A127438; AFIT/GEP/PH/82D-24) Avail: NTIS HC A04/MF A01 CSCL 09/2

Computer-aided geometric optical design was investigated. The definition of terms and optical design procedures were studied. Available computer programs were compared and FALCON was selected. Test problems were evaluated with FALCON to aid in understanding computerized optical design procedures. An 18 inch long optical system with a 50 meter effective focal length was designed for the Air Force Weapons Laboratory. This optical system would image, on a solid state detector, an interference pattern created by two laser beam samples, to allow the two lasers to be locked in phase with each other. The starting point of the design improved until the desired tolerances were met or exceeded.

Author (GRA)

N83-32346# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.

UNIVERSAL MICROCOMPUTER INTERFACE FOR DATA ACQUISITION M.S. Thesis

William Burcher Brown, Jr. Mar. 1983 158 p refs

(AD-A127875) Avail: NTIS HC A08/MF A01 CSCL 09/2

A Universal Interface Device (UID) was constructed for the TRS-80 Model I microcomputer that enables it to perform a wide variety of digital and analog data acquisition and control functions within the Department of Aeronautics. The system was tested and validated for low frequency data acquisition and control in a wind tunnel experiment and higher frequency applications were predicted with the development of additional software. The UID consists of a collection of off the shelf and author designed components assembled within a common enclosure to provide eight channels of analog to digital input, a single channel of digital to analog output, eight bit TTL level digital to digital input and output, and eight power relay outputs all under software control of the host microcomputer. Applications software, calibration tables, and a validation experiment were prepared and included within the appendices. The UID produced results within one percent of manual observations. Author (GRA)

N83-32347# Naval Training Analysis and Evaluation Group, Orlando, Fla.

THE APPLICATION OF DISTRIBUTED SYSTEM ARCHITECTURES FOR COMPUTER-BASED INSTRUCTIONAL SYSTEMS IN THE NAVAL EDUCATION AND TRAINING COMMAND

Barney L. Capehart and Charles L. Morris, Jr. Feb. 1983 88 p refs

(AD-A127694; TAEG-TR-141) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report examines the technology of distributed data processing systems in terms of its application to Navy computer based instruction system implementation. It presents the concept of distributed systems, discusses the major components and design considerations, and considers the benefits of applying this technology to individualized instruction for Naval training. GRA

N83-32348# California Univ., Livermore. Lawrence Livermore Lab.
FREQUENCY RESPONSE OF FINITE-APERATURE SAMPLE-AND-HOLD SYSTEMS
A. S. Blum Oct. 1982 7 p Presented at the IEEE Nucl. Sci. Symp., Washington, D.C., 20-22 Oct. 1982 Submitted for publication
(Contract W-7405-eng-48)
(DE83-002279; UCRL-88278; CONF-821011-18) Avail: NTIS HC A02/MF A01

Sampling systems frequently store the collected samples in the form of a series of numbers in the memory of a digital computer. Ideally, the stored number represents the magnitude of the sampled function at one instant of time. Practically, the stored number is the result of some weighted averaging of the sampled function during a finite time interval. As this acquisition time interval becomes a significant fraction of the sample period, the averaging process degrades the sample-system frequency response. The procedure is reviewed whereby one calculates the frequency response for the class of systems that are linear and time-varying or constant during the acquisition interval. The transfer function is calculated for a sampler that first acts as an RC integrator during the acquisition time, then transfers the accumulated charge to some holding circuit (for A-D conversion, and finally begins to acquire the next sample. DOE

N83-32349# National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
TAXONOMY OF TOOL FEATURES FOR THE ADA (TRADE NAME) PROGRAMMING SUPPORT ENVIRONMENT (APSE) Final Report
Raymond C. Houghton, Jr. Feb. 1983 42 p refs Sponsored in part by Dept. of Defense
(PB83-179002; NBSIR-82-2625) Avail: NTIS HC A03/MF A01 CSCL 09B

A categorization of the software development tool features of the Ada Programming Support Environment (APSE) is presented. The features of two Ada environments, the Ada Language System (ALS) and the Ada Integrated Environment (AIE), are compared. The underlying features of the APSE are presented. GRA

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N83-32350# General Accounting Office, Washington, D. C. Accounting and Financial Management Div.
FEDERAL AGENCIES COULD SAVE TIME AND MONEY WITH BETTER COMPUTER SOFTWARE ALTERNATIVES
20 May 1983 29 p refs
(GAO/AFMD-83-29; B-210595) Avail: NTIS HC A03/MF A01

Problems Federal agencies have in satifying their application software needs, options available to agencies to acquire application software, whether agencies were taking advantage of the most beneficial options, and recommendations that would help satisfy Federal software needs faster and move economically are identified. Author

N83-32351# Bettis Atomic Power Lab., Pittsburgh, Pa.
A PACER: A MONTE CARLO TIME-DEPENDENT SPECTRUM PROGRAM FOR GENERATING FEW-GROUP DIFFUSION-THEORY CROSS SECTIONS
N. R. Candelore, W. E. Kerrick, E. G. Johnson, R. C. Gast, D. E. Dei, and D. L. Fields Sep. 1982 231 p refs
(Contract DE-AC11-76PN-00014)
(DE83-003779; WAPD-TM-1518) Avail: NTIS HC A11/MF A01

The PACER Monte Carlo program for the CDC-7600 per forms fixed source or eigenvalue calculations of spatially dependent neutron spectra in rod-lattice geometries. The neutron flux solution is used to produce few group, flux-weighted cross sections spatially averaged over edit regions. In general, PACER provides environmentally dependent flux-weighted few group microscopic cross sections which can be made time (depletion) dependent. These cross sections can be written in a standard POX output film format. To minimize computer storage requirements, PACER allows separate spectrum and edit options. PACER also calculates an explicit (n, 2n) cross section. The PACER geometry allows multiple rod arrays with axial detail. This report provides details of the neutron kinematics and the input required. DOE

N83-32352*# Kentron International, Inc., Hampton, Va.
A DATA BASE PROCESSOR SEMANTICS SPECIFICATION PACKAGE Final Report
Paul A. Fishwick Jun. 1983 37 p refs
(Contract NAS1-16000)
(NASA-CR-172172; NAS 1.26:172172) Avail: NTIS HC A03/MF A01 CSCL 09B

A Semantics Specification Package (DBPSSP) for the Intel Data Base Processor (DBP) is defined. DBPSSP serves as a collection of cross assembly tools that allow the analyst to assemble request blocks on the host computer for passage to the DBP. The assembly tools discussed in this report may be effectively used in conjunction with a DBP compatible data communications protocol to form a query processor, precompiler, or file management system for the database processor. The source modules representing the components of DBPSSP are fully commented and included. Author

N83-32353*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EVALUATING SOFTWARE DEVELOPMENT BY ANALYSIS OF CHANGES: THE DATA FROM THE SOFTWARE ENGINEERING LABORATORY
Dec. 1982 78 p refs
(NASA-TM-85394; SEL-82-008; NAS 1.15:85394) Avail: NTIS HC A05/MF A01 CSCL 09B

An effective data collection methodology for evaluating software development methodologies was applied to four different software development projects. Goals of the data collection included characterizing changes and errors, characterizing projects and programmers, identifying effective error detection and correction techniques, and investigating ripple effects. The data collected consisted of changes (including error corrections) made to the software after code was written and baselined, but before testing began. Data collection and validation were concurrent with software development. Changes reported were verified by interviews with programmers. Author

N83-32354*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GLOSSARY OF SOFTWARE ENGINEERING LABORATORY TERMS
Dec. 1982 40 p refs
(NASA-TM-85395; SEL-82-005; NAS 1.15:85395) Avail: NTIS HC A03/MF A01 CSCL 09B

A glossary of terms used in the Software Engineering Laboratory (SEL) is presented. The terms are defined within the context of the software development environment for flight dynamics at Goddard Space Flight Center. A concise reference for clarifying and understanding the language employed in SEL documents and data collection forms is provided. Author

N83-32355*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RECOMMENDED APPROACH TO SOFWARE DEVELOPMENT
Frank E. McGarry, Jerry Page (Computer Sciences Corp.), Suellen Eslinger (Computer Sciences Corp.), Victor Church (Computer Sciences Corp.), and Phillip Merwarth Apr. 1983 275 p refs
(NASA-TM-85396; SEL-81-205; NAS 1.15:85396;
CSC/TM-83/6019) Avail: NTIS HC A12/MF A01 CSCL 09B

A set of guideline for an organized, disciplined approach to software development, based on data collected and studied for 46 flight dynamics software development projects. Methods and

practices for each phase of a software development life cycle that starts with requirements analysis and ends with acceptance testing are described; maintenance and operation is not addressed. For each defined life cycle phase, guidelines for the development process and its management, and the products produced and their reviews are presented. Author

N83-32356*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PROCEEDINGS OF THE SEVENTH ANNUAL SOFTWARE ENGINEERING WORKSHOP
Dec. 1982 394 p refs Workshop held in Greenbelt, Md., 1 Dec. 1982
(NASA-TM-85400; SEL-82-007; NAS 1.15:85400) Avail: NTIS HC A17/MF A01 CSCL 09B

The Software Engineering Laboratory, software tools, software errors and cost estimation are addressed. For individual titles, see N83-32357 through N83-32368.

N83-32357*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
WHAT HAVE WE LEARNED IN THE PAST 6 YEARS? MEASURING SOFTWARE DEVELOPMENT TECHNOLOGY
Frank E. McGarry *In its* Proc. of the 7th Ann. Software Eng. Workshop Dec. 1982 34 p refs (For primary document see N83-32356 20-61)
Avail: NTIS HC A17/MF A01 CSCL 09B

Software engineering research is reported. Data acquisition is reported. Author

N83-32358*# Maryland Univ., College Park. Dept. of Computer Science.
SOFTWARE ERRORS AND COMPLEXITY: AN EMPIRICAL INVESTIGATION
Victor R. Basili and Barry T. Perricone *In* NASA. Goddard Space Flight Center Proc. of the 7th Ann. Software Eng. Workshop Dec. 1982 49 p refs (For primary document see N83-32356 20-61)
Avail: NTIS HC A17/MF A01 CSCL 09B

The distributions and relationships derived from the change data collected during the development of a medium scale satellite software project show that meaningful results can be obtained which allow an insight into software traits and the environment in which it is developed. Modified and new modules were shown to behave similarly. An abstract classification scheme for errors which allows a better understanding of the overall traits of a software project is also shown. Finally, various size and complexity metrics are examined with respect to errors detected within the software yielding some interesting results. Author

N83-32359*# Maryland Univ., College Park. Dept. of Computer Science.
WHEN AND HOW TO USE A SOFTWARE RELIABILITY MODEL
Amrit L. Goel (Syracuse Univ., N.Y.), Victor R. Basili, and Peter M. Valdes *In* NASA. Goddard Space Flight Center Proc. of the 7th Ann. Software Eng. Workshop Dec. 1982 36 p (For primary document see N83-32356 20-61)
Avail: NTIS HC A17/MF A01 CSCL 09B

Proper use of software reliability models is discussed. Author

N83-32360*# Maryland Univ., College Park. Dept. of Computer Science.
SOFTWARE PROTOTYPING IN THE SOFTWARE ENGINEERING LABORATORY
Marvin V. Zelkowitz *In* NASA. Goddard Space Flight Center Proc. of the 7th Ann. Software Eng. Workshop Dec. 1982 22 p refs (For primary document see N83-32356 20-61)
(Grant NsG-5123)
Avail: NTIS HC A17/MF A01 CSCL 09B

Software prototyping and the flight dynamics analysis system (FDAS) are addressed. Author

N83-32361*# Stanford Research Inst., Calif. Computer Science Lab.
EXPERIENCES AND PERSPECTIVES WITH SRI'S TOOLS FOR SOFTWARE DESIGN AND VALIDATION
Joseph Goguen and Karl N. Levitt *In* NASA. Goddard Space Flight Center Proc. of the 7th Ann. Software Eng. Workshop Dec. 1982 23 p (For primary document see N83-32356 20-61)
Avail: NTIS HC A17/MF A01 CSCL 09B

Development of tools that include the STP theorem poer and its associated Design Verification Systems; PHIL, a meta-programmable context sensitive structured editor; Pegasus, a system for support of graphical programming; and OBJ, an ultra high level programming language based on rewrite rules and abstract data type is reported. Author

N83-32362*# Maryland Univ. Baltimore County, Catonsville. Dept. of Mathematics and Computer Science.
USER INTERFACE DESIGN OF SOFTWARE TOOL SYSTEM AS A TECHNOLOGY TRANSFER VEHICLE
Isao Miyamoto *In* NASA. Goddard Space Flight Center Proc. of the 7th Ann. Software Eng. Workshop Dec. 1982 12 p refs (For primary document see N83-32356 20-61)
Avail: NTIS HC A17/MF A01 CSCL 09B

Design considerations of an on going research project for developing an effective and easy to use tool system that supports entire maintenance phases are introduced. The primary focus is the design of an intelligent user interface mechanism. By analyzing why existing tools and tool systems are not used very effectively, we can define user requirements for the user interface mechanisms, specify design criteria of user interface functions, and introduce some features of the implementation. Because this project is still in process, intermediate evaluation and expected effectiveness are discussed. Author

N83-32363*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
DESIGN AIDS FOR REAL-TIME SYSTEMS (DARTS)
Paul A. Szulewski *In* NASA. Goddard Space Flight Center Proc. of the 7th Ann. Software Eng. Workshop Dec. 1982 20 p refs (For primary document see N83-32356 20-61)
Avail: NTIS HC A17/MF A01 CSCL 09B

Design-Aids for Real-Time Systems (DARTS) is a tool that assists in defining embedded computer systems through tree structured graphics, military standard documentation support, and various analyses including automated Software Science parameter counting and metrics calculation. These analyses provide both static and dynamic design quality feedback which can potentially aid in producing efficient, high quality software systems. Author

N83-32364*# Sperry Univac, Blue Bell, Pa. Software Technology Research.
SOFTWARE ERROR DATA COLLECTION AND CATEGORIZATION
Thomas J. Ostrand and Elaine J. Weyuker (New York Univ., N.Y.) *In* NASA. Goddard Space Flight Center Proc. of the 7th Ann. Software Eng. Workshop Dec. 1982 33 p refs (For primary document see N83-32356 20-61)
Avail: NTIS HC A17/MF A01 CSCL 09B

Software errors detected during development of an interactive special purpose editor system were studied. This product was followed during nine months of coding, unit testing, function testing, and system testing. A new error categorization scheme was developed. Author

N83-32365*# Yale Univ., New Haven, Conn. Dept. of Computer Science.
CLASSIFYING BUGS IS A TRICKY BUSINESS
W. Lewis Johnson, Stephen Draper (California Univ., La Jolla), and Elliot Soloway *In* NASA. Goddard Space Flight Center Proc. of the 7th Ann. Software Eng. Workshop Dec. 1982 18 p refs (For primary document see N83-32356 20-61)
(Contract N00014-82-K-0714)
Avail: NTIS HC A17/MF A01 CSCL 09B

Observations made in trying to build a bug classification scheme are described. Author

N83-32366*# Reifer Consultants, Inc., Torrance, Calif.
ERROR TAXONOMY: WHAT CAN BE GAINED?
Donna E. Buckland *In* NASA. Goddard Space Flight Center Proc. of the 7th Ann. Software Eng. Workshop Dec. 1982 28 p (For primary document see N83-32356 20-61)
Avail: NTIS HC A17/MF A01 CSCL 09B

Error taxonomy, the classification and quantification of errors, are discussed. Author

N83-32367*# IBM Federal Systems Div., Houston, Texas.
MAINTENANCE ESTIMATION METHODOLOGY
Kyle Y. Rone *In* NASA. Goddard Space Flight Center Proc. of the 7th Ann. Software Eng. Workshop Dec. 1982 28 p ref (For primary document see N83-32356 20-61)
Avail: NTIS HC A17/MF A01 CSCL 09B

A Rayleigh curve method of projection combined with a modified matrix method to forecast maintenance needs and required staffing levels is used. The curves generated by both methods are differenced to ascertain how much new work can be performed given the staffing live. Actual project data are compared to the projection to validate or modify the process. Author

N83-32368*# IBM Federal Systems Div., Gaithersburg, Md.
ESTIMATES OF SOFTWARE SIZE FROM STATE MACHINE DESIGNS
Robert N. Britcher and John E. Gaffney (National Weather Service, Silver Spring, Md.) *In* NASA. Goddard Space Flight Center Proc. of the 7th Ann. Software Eng. Workshop Dec. 1982 26 p refs (For primary document see N83-32356 20-61)
Avail: NTIS HC A17/MF A01 CSCL 09B

The length, or size (in number of Source Lines of Code) of programs represented as state machines, it is demonstrated, can be reliably estimated in terms of the number of internal state machine variables. Author

N83-32369*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOFTWARE ENGINEERING LABORATORY (SEL). DATA BASE ORGANIZATION AND USER'S GUIDE, REVISION 1
Pei-Shen Lo, David Wyckoff, Jerry Page, and Frank E. McGarry Mar. 1983 165 p refs
(NASA-TM-85397; SEL-81-102-Rev; NAS 1.15:85397; CSC/SD-83/6012-Rev) Avail: NTIS HC A08/MF A01 CSCL 09B

The structure of the Software Engineering Laboratory (SEL) data base is described. It defines each data base file in detail and provides information about how to access and use the data for programmers and other users. Several data base reporting programs are described also. Author

N83-32370*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CONFIGURATION ANALYSIS TOOL (CAT). SYSTEM DESCRIPTION AND USERS GUIDE (REVISION 1)
William Decker (Computer Sciences Corp.), Wayne Taylor (Computer Sciences Corp.), Frank E. McGarry, and Phil Merwarth Dec. 1982 139 p refs
(NASA-TM-85398; SEL-80-104-Rev; NAS 1.15:85398; CSC/SD-82/6125-Rev) Avail: NTIS HC A07/MF A01 CSCL 09B

A system description of, and user's guide for, the Configuration Analysis Tool (CAT) are presented. As a configuration management tool, CAT enhances the control of large software systems by providing a repository for information describing the current status of a project. CAT provides an editing capability to update the information and a reporting capability to present the information. CAT is an interactive program available in versions for the PDP-11/70 and VAX-11/780 computers. Author

N83-32371*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOFTWARE ENGINEERING LABORATORY (SEL) DATA BASE MAINTENANCE SYSTEM (DBAM) USER'S GUIDE AND SYSTEM DESCRIPTION
Pei-Shen Lo and David Card Apr. 1983 233 p refs
(NASA-TM-85399; SEL-81-103; NAS 1.15:85399) Avail: NTIS HC A11/MF A01 CSCL 09B

The Software Engineering Laboratory (SEL) Data Base Maintenance System (DBAM) is explained. The various software facilities of the SEL, DBAM operating procedures, and DBAM system information are described. The relationships among DBAM components (baseline diagrams), component descriptions, overlay descriptions, indirect command file listings, file definitions, and sample data collection forms are provided. Author

N83-32372# Army Armament Research and Development Command, Dover, N. J. Cost Analysis Div.
INTERACTIVE GRAPHICS PACKAGE TO FACILITATE A COMPARISON OF DATA WITH STATISTICAL DISTRIBUTIONS Final Report
George E. Mayernik Jan. 1983 50 p refs
(AD-A127147; ARRAC-83-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report describes the usage of an interactive FORTRAN computer program written for use on a Tekronix 4014 graphics terminal connected to a CDC 74/825/6600 computers under the NOS/BE operating system. The package is designed for visual analysis of data, testing the hypothesis that the data can be considered to be from one of several statistical distributions, density function parameter estimation, and performing one-sample goodness-of-fit tests. No prior computer experience is necessary to run this program; however, some statistical knowledge is required to interpret the output. A source code listing of the program may be obtained from the performing organization. Program and/or job control language modifications may be necessary for other than CDC computers and/or NOS/BE operating systems.
Author (GRA)

N83-32373# Stanford Univ., Calif. Dept. of Computer Science.
A DEDUCTIVE APPROACH TO THE DEBUGGING, VERIFICATION AND MODIFICATION OF PROGRAMS Interim Report, 1 Oct. 1981 - 30 Sep. 1982
Zohar Manna Oct. 1982 7 p refs
(Grant AF-AFOSR-0014-81; AF Proj. 2304)
(AD-A127900; AFOSR-83-0335TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

This report summarizes research activities concentrated on the following topics; (1) Verification of Concurrent Programs: The Temporal Framework; (2) Verification of Concurrent Programs: Temporal Proof Principles; (3) Verification of Sequential Programs: Temporal Axiomatization; (4) Verification of Concurrent Programs: A Temporal Proof System; (5) How to Cook a Temporal Proof System for General Languages; (6) Verification of Concurrent Programs: Proving Eventualities by Well-Founded Ranking; (7) Synthesis of Communicating Processes from Temporal Specifications; (8) Deductive Synthesis of the Unification Algorithm; and (9) Special Relations in Program Synthetic Deduction. GRA

N83-32374# California Univ., Berkeley. Electronics Research Lab.
DISTRIBUTING A DATABASE FOR PARALLELISM
E. Wong and R. H. Katz Feb. 1983 26 p refs
(Grant AF-AFOSR-3596-78; AF Proj. 2304)
(AD-A127856; AFOR-83-0330TR) Avail: NTIS HC A03/MF A01 CSCL 09/2

In this paper the authors treat the problem of subdividing a database and allocating the fragments to the sites in a distributed database system in order to maximize non-duplicative parallelism. Their goal is to establish a conceptual framework for distributing data without being committed to specific cost models. They introduce the concept of local sufficiency as a measure of parallelism, and show how certain classes of queries lead naturally to irredundant partitions of a database that are locally sufficient. For classes of queries for which no irredundant distribution is

locally sufficient, ways to introduce redundancy in achieveing local sufficiency are introduced. GRA

N83-32375# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Engineering Physics.
AN APPLICATION OF A COMPUTER OPTICAL DESIGN PROGRAM M.S. Thesis
William J. Welker, Jr. Dec. 1982 96 p refs
(AD-A127857; AFIT/GEP/PH/82D-26) Avail: NTIS HC A05/MF A01 CSCL 09/2

A survey was made of existing optical design computer programs and one was selected for use at the Air Force Institute of Technology. The program is named FALCON, and a number of its capabilities are described. It is then used to develop a lens system whose effective focal length is 21 meters, and whose overall length is about 45 cm. The purpose of the lens is to accept two laser beam samples from a source and focus the beam to a diffraction limited spot. Author

N83-32376# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
A CASE STUDY IN WRITING EFFICIENT PROGRAMS Interim Report
Jon Louis Bentley 25 Jan. 1983 38 p refs
(Contract N00014-76-C-0370)
(AD-A127572; CMU-CS-83-108) Avail: NTIS HC A03/MF A01 CSCL 09/2

The time and space performance of a computer program rarely matter, but when they do they can be of crucial importance to the success of the overall system. This paper discusses the performance issues that arose in the implementation of a small system (twelve programs, two thousand lines of code) for a small business. The paper emphasizes a general methodology for improving system performance; the details of the case study show how the general techniques are applied in a particular context. Author (GRA)

N83-32377# Naval Postgraduate School, Monterey, Calif. Dept. of Electric Engineering.
HARDWARE AND SOFTWARE IMPLEMENTATION OF AN INTERFACE BETWEEN THE UNIBUS AND THE GENERAL PURPOSE INTERFACE BUS M.S. Thesis
Ayers Haden Blocher, III Mar. 1983 69 p refs
(AD-A127564) Avail: NTIS HC A04/MF A01 CSCL 09/2

The Satellite Communications Laboratory at the Naval Postgraduate School uses a PDP-11/34A minicomputer to develop software in support of a satellite signal monitoring system. The General Purpose Interface Bus (GPIB) interconnects several general measurement devices used in support of the laboratory. The laboratory uses these measurement devices for diagnostic and simulation tests related to research in the satellite signal monitoring field. This thesis discusses the development of the hardware and software interface between the PDP-11/34A Unibus and the GPIB. The interface permits high level language programs under the control of the Unix operating system (version 6) on the PDP-11/34A to access any device on the GPIB. Author (GRA)

N83-32378# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
A SURVEY OF SOFTWARE QUALITY ASSURANCE METHODS AND AN EVALUATION OF SOFTWARE QUALITY ASSURANCE AT FLEET MATERIAL SUPPORT OFFICE M.S. Thesis
Michael Fuqua, Julius Sisco, and James Conroy Dec. 1982 119 p refs
(AD-A127676) Avail: NTIS HC A06/MF A01 CSCL 14/4

This paper is a survey of existing literature describing software quality assurance and an indepth evaluation of both selected industry quality assurance functions and the Fleet Material Support Office (FMSO) Quality Assurance Division. Quality control at FMSO is effected by the organizational element that produces the product and by a small, centralized staff. Improved systems development and a higher level of quality control are the goals of FMSO. The recommendations and conclusions offered are based on an extensive literature search of existing material on software quality assurance, an indepth study of selected industry quality assurance departments, and an examination of the current state of quality control procedures at FMSO. These recommendations, if implemented, should serve to improve the quality control at FMSO and assist the organization in achieving their goals. GRA

N83-32379# North Carolina Agricultural and Technical State Univ., Greensboro. Dept. of Electrical Engineering.
DISTRIBUTION OF FUNCTIONALITY AND LEVELS OF FUNCTIONALITY AS A SOLUTION TO THE CONOPS PROBLEM Final Report, 15 Aug. 1981 - 15 Feb. 1983
Harold L. Martin and Pakize S. Pulat Apr. 1983 74 p refs
(Grant DAAG29-81-G-0009)
(AD-A127651; ARO-18591.1-EL-H) Avail: NTIS HC A04/MF A01 CSCL 09/2

This document is the final report to study the distribution of functionality within a distributed system so as to provide the system with graceful degradation. In addition, overall system capabilities were studied in an effort to describe system performance as system resources were alleviated due to failure. GRA

N83-32380# Rome Air Development Center, Griffiss AFB, N.Y. Computer and S/W Engineering Branch.
NOTES ON THE CONVERSION OF LOGLISP FROM RUTGERS/UCI-LISP TO INTERLISP
Robert C. Schrag Jan. 1983 21 p refs
(AF Proj. 5581)
(AD-A127718; RADC-TM-83-1) Avail: NTIS HC A02/MF A01 CSCL 09/2

Conversion of the LogLisp(Logic programming in Lisp) Artificial Intelligence programming environment from its original Rutgers/UCI-Lisp (RUCI-Lisp) implementation to an InterLisp implementation is described. This report may be useful to researchers wishing to convert LogLisp to yet another Lisp dialect, or to those wishing to convert other RUCI-Lisp programs into InterLisp. It is also intended to help users of the InterLisp version of LogLisp to understand the implementation. The conversion process is described at a level aimed toward potential translators who might benefit from approaches taken and lessons learned. General issues of conversion of Lisp software between dialects are discussed, use of InterLisp's dialect translation package is described, and specific issues of non-mechanizable conversion are addressed. The latter include dialect differences in function definitions, arrays, integer arithmetic, i/o, interrupts, and macros. Subsequent validation, compilation, and efficiency enhancement of the InterLisp version are then described. A brief user's guide to the InterLisp version and points of contact for information on LogLisp software distribution are also provided. Author (GRA)

N83-32381# California Univ., Berkeley. Center for Pure and Applied Mathematics.
THE SOFTWARE SCENE IN THE EXTRACTION OF EIGENVALUES FROM SPARSE MATRICES
B. N. Parlett Mar. 1983 35 p refs
(Contract N00014-76-C-0013)
(AD-A127972; PAM-132) Avail: NTIS HC A03/MF A01 CSCL 09/2

The eigenvalue problem for large, sparse matrices is not yet understood well enough, in all its computational ramifications, to permit the rapid deployment of impeccable software to the masses in the style set by EISPACK. Indeed it is doubtful that the public is impatient for the arrival of this facility. Those with an urgent need for such software prize efficiency above generality. They have developed their own programs independently of the numerical analysts and will continue to do so unless the matrix experts go to them and demonstrate that they can be useful. The wide variety of computing environments is going to play havoc with naive concepts of portability. Transmission of thought is one of the two basic themes of science. The interesting and difficult task is to find the appropriate level at which to transmit. Author (GRA)

N83-32382# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
COMPUTER-SIMULATION STUDIES OF GRAIN BOUNDARY SYSTEMS AND MOLECULAR SOLIDS Final Report, 1 Jan. 1978 - 31 Jan. 1983
Sidney Yip 20 Apr. 1983 11 p refs
(Contract DAAG29-78-C-0006)
(AD-A127545; ARO-15199.7-PH) Avail: NTIS HC A02/MF A01 CSCL 09/2

Structural, thermodynamic and mechanical properties of bicrystals have been studied using molecular dynamics and Monte Carlo simulation. A grain boundary melting transition in a two-dimensional system has been observed. Atomic diffusion along grain boundaries was investigated by following in detail the migration of a vacancy initially introduced into the bicrystal. The activation energy for vacancy migration in iron has been determined, and thermal activation of Frenkel pairs in the grain boundary core was observed. Structural phase transformation in stressed solids has been studied using an extended Monte Carlo method. Stress-strain relations obtained for iron showed the existence of bcc <-> fcc transition under tension or compression. Dynamical properties of a one-dimensional nonlinear lattice (the U4-lattice) have been analyzed in terms of kink propagation and damping and kink diffusion. Both perturbation theory and molecular dynamic calculations were carried out. Author (GRA)

N83-32383# Naval Postgraduate School, Monterey, Calif. Dept. of Electrical Engineering.
AN APPROACH FOR IMPLEMENTING A MICROCOMPUTER BASED REPORT ORIGINATION SYSTEM IN THE ADA PROGRAMMING LANGUAGE M.S. Thesis
Michael Richard Critz Mar. 1983 297 p refs
(AD-A128028) Avail: NTIS HC A13/MF A01 CSCL 09/2

This thesis examines the use of an inexpensive commercial microcomputer for the preparation of Naval Reporting Structure Operational Reports. These highly formatted reports provide critical unit information used by the National Command Authority and Joint Chiefs of Staff in assessing the nation's defense posture. Since these reports are processed by computer, correct formatting and data entry are essential to preserve the timeliness and accuracy of the information. The requirements of a Report Origination System are investigated from the perspective of the system operator, the message drafter and the message releasing authority. Interfaces are developed which provides for system application to different hardware configurations. A subset of the Ada language is used to allow structured programming and data abstraction techniques. Elements of the Unit Status and Identity Report (UNITREP) are implemented using this method. Author (GRA)

N83-32384# BGS Systems, Inc., Waltham, Mass.
POD-HOS (PERFORMANCES ORIENTED DESIGN-HIGHER ORDER SOFTWARE) INTERFACES: AN EXAMINATION OF AXES/POD RELATIONSHIPS AND OTHER ISSUES
Dec. 1982 58 p refs Prepared in cooperation with High Order Software, Cambridge, Mass.
(Contract N00039-81-C-0183)
(AD-A128301; RPT-POD-1982-5) Avail: NTIS HC A04/MF A01 CSCL 05/1

This report addresses the feasibility of and requirements for interfacing two powerful software engineering tools - POD (Performance Oriented Design) and HOS (High Order Software). POD is a software engineering tool for the life cycle managemetn of system performance. It is a tool which provides a structured machine readable format (the System Description File or SDF) for representing a system's hardware architecture, software structure and external load demand. Based on this representation, POD provides a vehicle to calculate system performance values such as response time, throughput and device utilization. HOS is a methodology for defining systems in a hardware and language independent manner. It consists of a specification language AXES, which provides mechanisms for defining functions, control structures, and data types, a User System Evaluation and Integration Tool (USE.IT), which is a family of tools for defining systems using the AXES language, an Analyzer for analyzing the logical correctness of systems defined in AXES, and a family of RATs (Resource Allocation Tools), which translate descriptions from the AXES specification language into target languages such as FORTRAN and (potentially) POD. In considering the feasibility of and requirements for interfacing POD and HOS, is assessed in terms of its ability to describe the required POD input specifications. In addition, consideration is given to possible HOS extensions to support POD, and an approach for interfacing these tools is suggested. GRA

N83-32385# Florida Univ., Gainesville. Dept. of Materials Science and Engineering.
ADAPTATION OF COMPUTER PROGRAM FOR POURBAIX DIAGRAMS TO PERSONAL COMPUTERS Final Report
Ellis D. Verink, Jr. Apr. 1983 71 p refs
(Contract N00014-82-C-0718)
(AD-A128259) Avail: NTIS HC A04/MF A01 CSCL 09/2

The Fe-Cl-H2O system provides a simple example of the application of the program. The metallic species which will be considered are shown in Table 1. Later, a more complex example will be given. Since computer line printers display only capital letters, it is necessary to develop a suitable convention for writing chemical equations entirely on one line (no subscripts) and in capital letters. Any reasonable, internally consistent, convention may be employed. Further reference to Table 1 will supply insight into the type of convention employed by the authors in this example. In order to avoid confusion in reading the balanced chemical equations, the computer places an asterisk between all coefficients and the chemical species to which they refer. GRA

N83-32386# Software Options, Inc., Cambridge, Mass.
THE DEVELOPMENT OF A PROGRAMMING SUPPORT SYSTEM FOR RAPID PROTOTYPING Final Report
20 Apr. 1983 11 p refs
(Contract N00014-82-C-0173)
(AD-A128251; SO-01-83) Avail: NTIS HC A02/MF A01 CSCL 09/2

With a sufficiently large software project, the time between the development of the requirements for the software and the availability of an operational product is often measured in years. The longer this time, the less likely it is that the product will match the desires and expectations then prevalent among the user community. The idea of rapid prototyping is to shorten the time between the development of requirements and the availability of a prototype operational system. This report describes the results of work on Task 1, a part of the first year of work on a five-year project to develop a programming support environment and a collection of tools that support rapid prototyping. The support environment is based on the PDS (Program Development System) a system developed at Harvard University and will include the tools provided by the PDS plus a number of new ones specifically supporting rapid prototyping. The goals of Task 1 were to improve two tools in the PDS - the authors needed to improve the efficiency of one and generalize the other, to determine what needs to be done to the PDS to turn it into a production system, and to asses how to convert the PDS from a single-user system to a many-user system. GRA

N83-32387# Bell Aerospace Co., Buffalo, N. Y. Structure and Vehicle Systems Directorate.
FORCE METHOD OPTIMIZATION II. VOLUME 2: USER'S MANUAL Final Report, Aug. 1980 - Dec. 1982
J. R. Batt, B. J. Dale, S. C. Skalski, D. L. Witkop, and S. Gellin
Wright-Patterson AFB, Ohio AFWAL Nov. 1982 212 p refs
(Contract F33615-80-C-3214; AF Proj. 2307)
(AD-A128235; AFWAL-TR-82-3088-VOL-2) Avail: NTIS HC A10/MF A01 CSCL 09/2

This technical paper describes the Table Computation Program (TCP) developed to facilitate the manipulation and presentation of tabular information for analysis and analysis reporting purposes. This document includes an overview of how the program functions and instructions on how to use it. In addition, technical information

is provided for those who may wish to modify or expand the program to satisfy unique requirements. GRA

N83-32388# Los Alamos Scientific Lab., N. Mex. Equation-of-State and Opacity Group.
SESAME '83: REPORT ON THE LOS ALAMOS EQUATION-OF-STATE LIBRARY
Feb. 1983 15 p refs
(Contract W-7405-eng-36)
(DE83-008283; LALP-83-4) Avail: NTIS HC A02/MF A01

The SESAME Equation-of-State (EOS) Library is a standardized, computer-based library of tables of thermodynamic properties and FORTRAN subroutines developed and maintained by the Equation-of-State and Opacity Group (T-4 Group) of the Theoretical Division of Los Alamos National Laboratory. The Library currently contains data for about 70 materials, including metals, minerals, polymers, mixtures, etc., as well as simpler atomic and molecular species. The EOS's for existing materials in the Library are upgraded when appropriate, and EOS's for new materials are added frequently. The Library is presently being offered to all interested users free of charge. The thermodynamic data stored in the Library include tables of pressure P and energy E (and also in some cases, of Helmholtz free energy A), each as a function of density p and temperature T. Besides total P, E, and A tables, in many cases separated P, E, and A tables of thermal electronic and ion (including zero point) contributions are available. DOE

N83-32389# Illinois Univ., Urbana. Dept. of Physics.
ILLINOIS I/O REGISTER TO FASTBUS INTERFACE
R. Downing, D. Lesny, and W. Whitten Jan. 1983 6 p
(Contract DE-AC02-76ER-01195)
(DE83-007330; DOE/ER-01195-476; COO-1195-476) Avail: NTIS HC A02/MF A01

The input/output I/O Register to FASTBUS Interface (IORFI) is connected to a processor via two 16-bit output registers (OR1,OR2) and two 16-bit output resisters (IR1,IR2). One of the output registers (OR1) is used to specify the interface function which is performed when the interface is accessed via the Data-in Register (IR2) or the Data-out Register (OR2). The other input register (IR1) is used to read the direct status of the FASTBUS lines independent of OR1. The changes made to the SLAC design at the University of Illinois are described. DOE

N83-32390# Los Alamos Scientific Lab., N. Mex.
DERIVING METRICS FOR RELATING COMPLEXITY MEASURES TO SOFTWARE MAINTENANCE COSTS
Linda Brice, John Connell, and Joyce Taylor 1982 9 p refs Presented at the 13th Computer Meas. Group Conf., San Diego, Calif., 14 Dec. 1982
(Contract W-7405-eng-36)
(DE83-000672; LA-UR-82-2640; CONF-821202-3) Avail: NTIS HC A02/MF A01

Managers of software maintenance functions know that maintenance costs often increase with the age of software, and that maintenance costs are frequently proportional to software complexity. When the service to expense ratio degrades, sometimes a rewrite of the software results in a payoff. This research is a case study, presenting factors which contributed to the expense of one maintenance function. A descriptive model was used. It is suggested how the descriptive model could be a building block toward the derivation of a predictive model. A predictive model could be used in the presentation of a breakeven/payoff analysis, justifying the expense of rewriting existing software to contain minimum complexity by incorporating modern techniques. DOE

N83-32391# Argonne National Lab., Ill.
COMPUTER PROGRAM ABSTRACT AS SOFTWARE DOCUMENTATION
M. K. Butler 1982 6 p refs Presented at Federal Inform. Processing Standards Software Doc. Workshop, Washington, D.C., 3 Mar. 1982
(Contract W-31-109-eng-38)
(DE83-007570; CONF-820322-3) Avail: NTIS HC A02/MF A01

The computer program abstract, while not universally accepted as a form of software documentation, has long been recognized as a necessary reference document by the computer user community. Users have banded together in cooperative organizations with like computing environments, common disciplines, or a shared need for particular applications software, to promote the use of computer program abstracts as a means of publication, program exchange, and software development cost savings. Compilations of program abstract have been adopted to describe the contents of computer program libraries and to market the software industry's products. This paper first seeks to define a computer program abstract and to point out its distinguishing features. Then, users and proponents of computer program abstracts are identified, and prior standardization efforts are reviewed, followed by a discussion of the development of the American National Standard. DOE

N83-32392# California Univ., Livermore. Lawrence Livermore Lab.
ELECTRONICS ENGINEERING DEPARTMENT COMPUTER PROGRAM NEWSLETTER NO. 8: IMAGE-PROCESSING COMPUTER CODES
R. E. Twogood, M. R. Portnoff, and R. J. Sherwood Jan. 1983 40 p refs
(Contract W-7405-eng-48)
(DE83-007768; UCID-19563-8) Avail: NTIS HC A03/MF A01

This newsletter presents an overview of the image processing computer capabilities that are available in the Electronics Engineering Department at LLNL. The computer programs discussed cover a wide range of operations, from simple image file formatting and manipulation to sophisticated image enhancement, 2-D transforms, and image filtering operations. This series of Computer Program Newsletters is published to inform the LLNL research community of the various software capabilities available in the Electronics Engineering Department. DOE

N83-32393# Sheffield Univ. (England). Dept. of Control Engineering.
A NEW ALGORITHM FOR THE SOLUTION OF OPTIMAL CONTROL COMMUTATIVE BILINEAR SYSTEM
D. H. Owens and O. E. Abd-el-Raham Nov. 1982 39 p refs
(RR-212) Avail: NTIS HC A03/MF A01

An algorithm for the solution of an optimal control problem of a class of bilinear system with quadratic cost functional and unconstrained control is established. The algorithm assumes that the controller is implemented as a piecewise constant control to transfer the dynamical system to a corresponding static one represented by a set of algebraic equations in the form of the fixed point contraction mapping problem. The solution is proved to exist and be unique in certain situations. The algorithm yields guaranteed and fast convergence with minimum storage requirements. The feasibility of the algorithm for the case of multivariable commutative bilinear systems is studied, resulting in an analogous expression of optimal controls as that of the scalar case.
Author (ESA)

N83-32394# National Bureau of Standards, Washington, D.C.
BASIC UTILITY GRAPHICS SOFTWARE FOR THE HEWLETT-PACKARD 9845B DESKTOP COMPUTER
Clare Y. Trahan and Stephen W. Jensen Oct. 1982 157 p refs
(PB83-175760; NBSIR-82-2566) Avail: NTIS HC A08/MF A01 CSCL 09B

This report describes an interactive BASIC language graphics utility program designed to facilitate easy plotting of X,Y data. The program operates on a Hewlett-Packard 9845B desktop computer, in its standard configuration, and uses a Hewlett-Packard 9872 A four pen digital plotter. The program allows the user to view X,Y data graphically, and provides a broad range of plotting options so that publication quality graphs and transparencies may be created using up to four colors on the digital plotter. Data may be digitized from a user's graph on the digital plotter, generated as a user defined function, or input directly from the computer keyboard or magnetic tape cassette. Data may be plotted on the

computer CRT, on the computer's internal thermal printer, or on the digital plotter. GRA

N83-32395# National Bureau of Standards, Washington, D.C. Inst. for Computer Science and Technology.
COST-BENEFIT IMPACT STUDY ON THE ADOPTION OF THE DRAFT PROPOSED REVISED X3.23 AMERICAN NATIONAL STANDARD PROGRAMMING LANGUAGE COBOL
Marco Fiorella (Fiorella, Shaw and Associates) and John Cugini Mar. 1983 79 p refs Prepared in cooperation with Aurora Associates, Inc.
(PB83-191098; NBSIR-83-2639) Avail: NTIS HC A04/MF A01 CSCL 09B

The purpose of the study is to assess the estimated costs and benefits for the Federal Government which would result from adoption of the proposed revision of American National Standard COBOL as a Federal Information Processing Standard (FIPS). Potential benefits of $90.2 million have been identified, stemming primarily from improved productivity in both the development and maintenance of COBOL programs. Author (GRA)

N83-32396# Israel Aircraft Industries Ltd., Tel-Aviv. Engineering Div.
LOW COST SATELLITE FOR FAST INTERACTIVE GRAPHICS IN A TIME-SHARING ENVIRONMENT
B. Meyer Dec. 1981 16 p refs
(PB83-187336; IAITIC-82-1009) Avail: NTIS HC A02/MF A01 CSCL 09B

This paper describes a system that improves the performance of a time-shared host computer for users of TEKTRONIX series 4010/4014/4015 graphics terminals. The system consists of a mini or microcomputer situated at the terminal, a program that runs in the satellite computer, and a library of FORTRAN callable subroutines that provide a convenient interface between an application program in the host computer and the program in the satellite computer. Author (GRA)

62 COMPUTER SYSTEMS

Includes computer networks.

N83-32397*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NUMERICAL AERODYNAMIC SIMULATION (NAS)
V. L. Peterson, W. F. Ballhaus, Jr., and F. R. Bailey Jul. 1983 25 p refs Presented at the Conf. on Large Scale Sci. Computation Submitted for publication
(NASA-TM-84386; A-9404; NAS 1.15:84386) Avail: NTIS HC A02/MF A01 CSCL 09B

The history of the Numerical Aerodynamic Simulation Program, which is designed to provide a leading-edge capability to computational aerodynamicists, is traced back to its origin in 1975. Factors motivating its development and examples of solutions to successively refined forms of the governing equations are presented. The NAS Processing System Network and each of its eight subsystems are described in terms of function and initial performance goals. A proposed usage allocation policy is discussed and some initial problems being readied for solution on the NAS system are identified. Author

N83-32398# California Univ., Berkeley. Lab. for Electronics Research.
NETWORK MANAGEMENT RESEARCH Final Report, 14 Aug. 1982 - 14 Mar. 1983
C. V. Ramamoorthy 14 Mar. 1983 44 p refs
(Contract DAAG29-79-C-0171)
(AD-A127667; ARO-16984.2-EL-A) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report deals with important issues which concern functional components that are present in a distributed processing system for control purposes. These components are global information management, dynamic reconfiguration, deadlock handling, and the communication-oriented components of protocol, and routing. In the management of global information, the ensuring of consistency and availability are crucial, and unsolved problems exist in integrating techniques for providing these attributes in a viable manner. Dynamic reconfiguration, necessary for providing load-balancing and reliability, poses the problems of design of the state determination mechanism, the derivation of conditions for reconfigurability and the design of reconfiguration strategies. Correct and efficient deadlock detection algorithms need to be developed to resolve deadlocks due to concurrent usage of resources. In the aera of commnication protocols, efficient protocol analysis techniques and tools for protocol specification and design are needed to ensure the correctness of each class of protocols. In the design of routing algorithms, distributed routing algorithms are usually preferred. Hierarchical routing algorithms are more suitable for very large networks; however, little work has been done in this area. GRA

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N83-32399# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
COMPUTATIONAL INTROSPECTION
John Batali Feb. 1983 70 p refs
(Contract N00014-80-C-0505)
(AD-A127132; AI-M-701) Avail: NTIS HC A04/MF A01 CSCL 05/10

Introspection is the process of thinking about one's own thoughts and feelings. In this paper, the author discusses recent attempts to make computational systems that exhibit introspective behavior. Each presents a system capable of manipulating representations of its own program and current context. He argues that introspective ability is crucial for intelligent systems--without it an agent cannot represent certain problems that it must be able to solve. A theory of intelligent action would describe how and why certain actions intelligently achieve an agent's goals. The agent would both embody and represent this theory: it would be implemented as the program for the agent; and the importance of introspection suggests that the agent represent its theory of action to itself. Author (GRA)

N83-32400# Mitre Corp., McLean, Va.
AN OVERVIEW OF ARTIFICIAL INTELLIGENCE-BASED TEACHING AIDS
P. Kathie Groveston Dec. 1982 98 p refs
(Contract F19628-83-C-0001)
(AD-A127702) Avail: NTIS HC A05/MF A01 CSCL 09/2

This paper discusses dome of the ways that artificial intelligence research has contributed to the development of teaching systems. Two aspects of artificial intelligence will be covered: object oriented programming languages (languages which perform symbolic as well as numerical processing by sending messages to objects rather than calling procedures), and expert systems (computer programs which solve problems by using knowledge and procedures obtained from human experts). GRA

N83-32401# Illinois Univ., Urbana-Champaign. Coordinated Science Lab.
AN EXPERT DISTRIBUTED ROBOTICS SYSTEM WITH COMPREHENSION AND LEARNING ABILITIES IN THE AIRCRAFT FLIGHT DOMAIN Annual Technical Report, 1 Jan. - 30 Dec. 1982
David L. Waltz, Gerald DeJong, and R. T. Chien Feb. 1983 48 p refs
(Contract F49620-82-K-0009; AF PROJ. 2394)
(AD-A127739; AFOSR-83-0334TR; T-123) Avail: NTIS HC A03/MF A01 CSCL 06/4

The goals of this project are to better understand the processes involved in reasoning about and troubleshooting physical mechanims. This will lay the foundation for the design of expert systems to carry out these processes automatically. Of particular interest are results that will allow novel applications for the aircraft flight domain. The work falls into three broad areas: understanding natural language; learning; and mechanism modeling. GRA

N83-32402# Arizona State Univ., Tempe. Group for Computer Studies of Strategies.
AN ARTIFICIAL INTELLIGENCE TECHNIQUE TO GENERATE SELF-OPTIMIZING EXPERIMENTAL DESIGNS Interim Report
Nicholas V. Findler and Robert F. Cromp 1 Feb. 1983 12 p refs
(Grants AF-AFOSR-0340-82; AF Proj. 0220-81)
(AD-A127764; AFOSR-83-0337TR; GCSS-TR-12; TR-83-001) Avail: NTIS HC A02/MF A01 CSCL 06/4

The paper describes a completed and independent module of a large-scale system, the Quasi-Optimizer (QO). The QO system has three major objectives: (1) to observe and measure adversaries' behavior in a competitive environment, to infer their strategies and to construct a computer model, a descriptive theory, of each; (2) to identify strategy components, evaluate their effectiveness and to select the most satisfactory ones from a set of computed descriptive theories; and (3) to combine these components in a quasi-optimum strategy that represents a normative theory in the statistical sense. GRA

N83-32403# Rochester Univ., N. Y. Graduate School of Management.
EVALUATION OF THE TOTAL TIME IN SYSTEM IN A PREEMPT/RESUME PRIORITY QUENE VIA A MODIFIED LINDLEY PROCESS
J. Keilson and U. Sumita Oct. 1982 35 p refs Sponsored in part by GTE Labs.
(Grant AF-AFOSR-0043-79; AF Proj. 2304)
(AD-A127814; AFOSR-83-0328TR; WP-8219) Avail: NTIS HC A03/MF A01 CSCL 12/1

It is shown that the waiting time sequences of low priority customers before first entry into service is a Lindley process modified by replacement. A variety of descriptive distributions, transient and stationary, is obtained numerically via the Laguerre transform method. Author

N83-32404# Oxford Univ. (England). Engineering Lab.
ROBUSTNESS WITH SIMULTANEOUS POLE AND ZERO MOVEMENT ACROSS THE J-OMEGA AXIS
Ian Postlethwaite and Yung Kuan Foo Apr. 1983 44 p refs
(OUEL-1465/83) Avail: NTIS HC A03/MF A01

Tests for assessing the robustness of the stability property of a feedback design are presented. The tests offer a wider scope of application than those previously describe in the literature. The main result is a robustness test which can be used to assess closed-loop stability when the nominal plant model and perturbed plant model (representing uncertainty) have different numbers of poles and zeros in the right half-plane. The test also indicates over which frequencies good sensitivity and good robustness properties can be had, and over which frequencies a compromise has to be made. If there are no uncertain zeros which can move across the imaginary axis, good sensitivity and robust stability are compatible objectives over all frequencies. Author (ESA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N83-32405 National Physical Lab., Teddington (England). Div. of Information Technology and Computing.
THE ALGEBRAIC RICCATI EQUATION: A SUMMARY REVIEW OF SOME AVAILABLE RESULTS
M. A. Singer and S. J. Hammarling Jan. 1983 39 p refs
(NPL-DITC-23/83; ISSN-0262-5369) Copyright. Avail: Issuing Activity

The standard form of the algebraic Riccati equation (ARE) is defined and results concerning the existence and properties of solutions are presented. Results which involve different assumptions about the coefficient matrices in the ARE are summarized. The properties of Hamiltonian matrices and of symplectic matrices were developed. Methods for finding the Cholesky factor of a positive definite solution of the ARE are stated. The linear quadratic gaussian (LQG) control problem and its relation to the ARE are considered. The Hermitian pencil that defines an alternative approach the LQG problem is treated, and results are derived using a known canonical form. The Riccati group of transformations of the LQG problem is mentioned. Author (ESA)

N83-32406# Office of Naval Research, London (England).
NATO/LONDON MATHEMATICAL SOCIETY ADVANCED STUDY INSTITUTE ON SYSTEMS OF NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS
R. L. Sternberg (ONR, Boston, Mass.) 28 Feb. 1983 5 p Conf. held at Oxford, England, 25 Jul. - 7 Aug. 1982
(AD-A126996; ORNL-C-2-83) Avail: NTIS HC A02/MF A01 CSCL 12/1

Major topics at the conference included problems in non-linear elasticity, applications of bifurcation to mechanics, analysis and computational fluid dynamics, nonelliptic problems and phase transitions, and dynamical systems and practical differential equations. Author (GRA)

N83-32407# Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
FAST KALMAN FILTERING FOR ARMA (AUTOREGRESSIVE MOVING AVERAGE) PROCESSES: FIXED POINT IMPLEMENTATION M.S. Thesis Colorado State Univ.
Sigurdur Sigurdsson 15 Mar. 1983 138 p refs
(AD-A126994) Avail: NTIS HC A07/MF A01 CSCL 12/1

Kalman predictors and filters are implemented in fixed point arithmetic on a 16-bit INTEL 8086 microprocessor. Results from this implementation are compared with corresponding results for a 16-bit floating point implementation on an 8-bit 8080 microprocessor. Both implementations are carried out using an INTEL MDS 230 development system. Floating point code is written in FORTRAN and fixed point code is written in Assembly language. The Kalman filters and predictors are realized in a fast form that uses the so-called fast Kalman gain algorithm. This algorithm for the gain is inherently fixed point. Scaling rules for Kalman filters and predictors are derived, and expressions are derived for rounding error variances. The numerical results show that low order fixed point realizations perform very close to the floating point realizations. Author (GRA)

N83-32408# Textron Bell Aerospace Co., Buffalo, N. Y.
FORCE METHOD OPTIMIZATION 2. VOLUME 1: THEORETICAL DEVELOPMENT Final Technical Report, Aug. 1980 - Dec. 1982
James R. Batt, S. Gellin, and R. A. Gellatly Wright-Patterson AFB, Ohio AFWAL Nov. 1982 126 p refs
(Contract F33615-80-C-3214; AF Proj. 2307)
(AD-A127073; AFWAL-TR-82-3088-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 12/1

The document investigates the utilization of the force method of finite element analysis for the automatic iterative design of aircraft structures with stress, displacements, maximum and minimum size and dynamic constraints. It develops a rapid reanalysis method based on the force method for damage assessment. Research has resulted in a computer code named OPTFORCE II an expansion of code OPTFORCE I. Multiple loading capabilities and four finite elements have been included. These are: membrane triangle, membrane quadrilateral, shear panel and bar (axial force). Examples of problems solved by the OPTFORCE II code are presented and compared to the optimization code OPTIM III for purposes of establishing the efficiency of the force method vs. the 'displacement' method of analysis. A

technical discussion of the research conducted is presented wherein conclusions and recommendations for future research topics are given. GRA

N83-32409# University of Southern California, Los Angeles. Dept. of Electrical Engineering.
MULTIPLE STATE MODELS WITH COVARIATES: ANALYSIS AND SIMULATION Final Report, Jun. 1981 - 30 Mar. 1983
V. K. Murthy 1 Apr. 1983 66 p refs
(Grant AF-AFOSR-0162-81; AF Proj. 2304)
(AD-A127439; AFOSR-83-0301TR) Avail: NTIS HC A04/MF A01 CSCL 12/1

The research reported in this document deals with a multiple state, staged failure phenonmenon with state specific covariates characteristic of the states. Different types of censoring was taken into consideration. The classical maximum likelihood estimation is compared with Cox's partial likelihood estimation for efficiency, since maximum likelihood estimation of covariate effects depends on the baseline failure rate, while partial likelihood estimation does not. Results of analysis as well as simulation are presented. Author (GRA)

N83-32410# Naval Underwater Systems Center, New London, Conn. Information Services Dept.
SOLUTION OF SYSTEMS OF COMPLEX LINEAR EQUATIONS IN THE L INFINITY NORM WITH CONSTRAINTS ON THE UNKNOWNS
Roy L. Streit 18 Apr. 1983 61 p refs
(AD-A127883; NUSC-TR-6913) Avail: NTIS HC A04/MF A01 CSCL 12/2

An algorithm for the numerical solution of general systems of complex linear equations in the L infinity, or Chebyshev, norm is presented. The objective is to find complex values for the unknowns so that the maximum magnitude residual of the system is a minimum. The unknowns are required to satisfy certain general convex constraints. In particular, bounds on the magnitudes of the unknowns are imposed. In the algorithm presented here, this problem is replaced by a linearized problem. The linearized problem is a linear program which is generated in such a way that the relative error between its (exact) solution and the (exact) solution of the original problem can be estimated without knowing a priori the solution of either. Furthermore, the maximum relative error can easily be made as small as desired by selecting an appropriate linearized problem. Order of magnitude improvements in both computation time and computer storage requirements in an implementaiton of the simplex algorithm to this linear program are presented. Three numerical examples are included, one of which is a discretized complex function approximation problem. Extrapolation and an active set method are suggested for solving the general problem when greater accuracy is required than can be obtained economically by solving the linearized problems. GRA

N83-32411# Duke Univ., Durham, N. C. Dept. of Computer Science.
A RESULT ON THE COMPUTATIONAL COMPLEXITY OF HEURISTIC ESTIMATES FOR THE A ALGORITHM
Marco Valtorta Jan. 1983 27 p refs
(Grant AF-AFOSR-0221-81; AF Proj. 2304)
(AD-A127901; AFOSR-83-0343TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

The performance of a new heuristic search algorithm is analyzed. The algorithm uses a formal representation that contains enough information to compute the heuristic evaluation function h(n), without requiring a human expert to provide it. The new algorithm is shown to be less efficient than the Dijkstra algorithm, according to the complexity measure number of node expansion. Researchers attempt an interpretation of this strong negative result. Other properties of the new algorithm are discussed in references Valt80, GSoma79, GSValt80. A short discussion of related research, some of which is in progress, concludes the paper. Author (GRA)

N83-32412# Wisconsin Univ., Madison. Center for Mathematics Research.
BIVARIATE CARDINAL INTERPOLATION BY SPLINES ON A THREE-DIRECTION MESH
Carl deBoor, Klaus Hoellig, and Sherman Riemenschneider Mar. 1983 40 p refs Sponsored in part by the Canadian NSERC
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A127939; MRC-TSR-2485) Avail: NTIS HC A03/MF A01 CSCL 12/1

In a series of monographs Schogenberg developed a comprehensive theory of univeriate cardinal splines. His results strongly influenced the analysis of totally positive matrices. In this report the author extend two of his basic results on cardinal interpolation to bivariate box-splines. They show that, for functions of exponential type, cardinal interpolation is a rapidly convergent approximation process as the degree tends to infinity. Being not restricted to a tensor product mesh gives a greater flexibility, and because of the exponential decay of the Lagrange functions, spline interpolation is suitable, e.g., for data smoothing. They also expect that bivariate cardinal splines have a similar significance for theoretical questions as in the univariate case. GRA

N83-32413# Wisconsin Univ., Madison. Center for Mathematics Research.
A NONLINEAR INTEGRAL EQUATION OCCURING IN A SINGULAR FREE BOUNDARY PROBLEM
Klaus Hoellig and John A. Nohel Jan. 1983 18 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A127940; MRC-TSR-2475) Avail: NTIS HC A02/MF A01 CSCL 12/1

One motivation for the study of the Cauchy problem is its similarity with the well-known one phase Stefan problem (in one space dimension). The principal motivation for the study of this problem is that it serves as a prototype of nonlinear parabolic problems which arise as monotone convexifications of nonlinear diffusion equations with nonmonotone constitutive functions phi. GRA

N83-32414# Wisconsin Univ., Madison. Center for Mathematics Research.
A CONDITION NUMBER FOR DIFFERENTIABLE CONVEX INEQUALITIES
O. L. Mangasarian Jan. 1983 15 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-82-00632)
(AD-A127941; MRC-TSR-2476) Avail: NTIS HC A02/MF A01 CSCL 12/1

For a system of differentiable convex inequalities, a new bound is given for the absolute error in an infeasible point in terms of the absolute residual. By using this bound a condition number is defined for the system of inequalities which gives a bound for the relative error in an infeasible point in terms of the relative residual. Author (GRA)

N83-32415# Wisconsin Univ., Madison. Center for Mathematics Research.
AN ITERATIVE METHOD FOR SOLVING FINITE DIFFERENCE APPROXIMATIONS TO STOKES EQUATIONS
John C. Strikwerds Mar. 1983 28 p refs
(Contract DAAG29-80-C-0041)
(AD-A127704; MRC-TSR-2490) Avail: NTIS HC A03/MF A01 CSCL 12/1

A new iterative method is presented for solving finite difference equations which approximate the steady Stokes equations. The method is an extension of successive-over-relaxation and has two iteration parameters. Perturbation methods are used to analyze the iteration matrix. Sufficient conditions for the convergence of the iterative method are obtained and it is shown that many reasonable finite difference schemes for the Stokes equations satisfy these conditions. Computational examples are given to show the efficiency of the method. GRA

N83-32416# Army Coastal Engineering Research Center, Fort Belvoir, Va. Engineering Geology Branch.
FORCING REGRESSION THROUGH A GIVEN POINT USING ANY FAMILIAR COMPUTATIONAL ROUTINE

Edward B. Hands Mar. 1983 19 p refs
(AD-A127868; CERC-TP-83-1) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report describes a simple method for obtaining the prediction equation best fit to all data points (in the least squares sense) while forcing an exact fit at any known point. The decision to constrain the solution at a point should be justified on theoretical grounds without appeal to data. Examples are given. When required any familiar regression program can be forced to select the best line through a given point by simply adjusting and extending the data entry. All necessary changes to the program results (test statistics and estimates of regression parameters) can be accomplished without modifying the computer program.
Author (GRA)

N83-32417# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
FAILURE DETECTION WITH UNCERTAIN MODELS
Xi-Cheng Lou, Alan S. Willsky, and George C. Verghese Mar. 1983 4 p refs Presented at the Am. Control Conf., 1983
(Grant NGL-22-009-124; Contract N00014-77-C-0224)
(NASA-CR-172835; NAS 1.26:172835; AD-A127881; LIDS-P-1290) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this paper the author considers the issue of robust failure detection. In one way or another all failure detection methods generate signals which tend to highlight the presence of particular failures if they have actually occurred. However, if any model uncertainties have effects on the observables which are at all like those of one or more of the failure modes, these will also be accentuated. Consequently the problem of robust failure detection is concerned with generating signals which are maximally sensitive to some effects (failures) and minimally sensitive to other (model errors). Author (GRA)

N83-32418# Stanford Univ., Calif. Dept. of Statistics.
A STATISTICAL APPROACH TO ZONAL POLYNOMINALS Thesis
Akimichi Takemura Jan. 1983 103 p refs
(Contracts DAAG29-82-K-0156; N00014-75-C-0442)
(AD-A127624; ARO-19065.7-MA; TR-7) Avail: NTIS HC A06/MF A01 CSCL 12/1

Zonal polynomials form one of the essential tools for expressing noncentral distributions arising in multivariate analysis. However, they have not been used very often or usually taught mainly because (i) the theory has been based on some branches of advanced mathematics, and (ii) the computational difficulty. In this dissertation a self-contained theory of zonal polynomials is developed in the framework of standard multivariate analysis. Zonal polynomials will be defined as characteristic vectors of a linear transformation in the vector space of homogeneous symmetric polynomials. From this definition almost all known properties of zonal polynomials are derived, as well as some new properties. In addition to theoretical considerations, computational aspects of zonal polynomials are discussed extensively. Author (GRA)

N83-32419# California Univ., San Diego. Dept. of Electrical Engineering and Computer Sciences.
EVALUATING THE DETECTABILITY OF GAUSSIAN STOCHASTIC SIGNALS BY STEEPEST-DESCENT INTEGRATION
Carl W. Helstrom 1983 39 p refs Submitted for publication
(Grant AF-AFOSR-0343-82; AF Proj. 2304)
(AD-A127604; AFOSR-83-0285TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

It is shown how to compute the detection probability of certain signals by numerical integration of the Laplace inversion integral involving the characteristic function or the moment-generating function of the detection statistic. The contour of integration is taken as the path of steepest descent of the integrand and is determined numerically as the integration proceeds. The method is applied to calculating the performance of the optimum detector of a Gaussian stochastic signal in white noise when the signals actually present have a different average s.n.r. from that assumed in the design. Results are presented for narrowband signals with Lorentz and rectangular spectral densities. The detectability of the former is shown to be more sensitive than that of the latter to the value of the design s.n.r. The relative disadvantage of the threshold detector, also assessed by this method, is smaller for signals with a rectangular than for those with a Lorentz spectral density. Author (GRA)

N83-32420# Wisconsin Univ., Madison. Center for Mathematics Research.
ON POLYNOMIAL APPROXIMATION IN THE UNIFORM NORM BY THE DISCRETE LEAST SQUARES METHOD
Lothar Reichel Jan. 1983 20 p refs
(Contract DAAG29-80-C-0041)
(AD-A127693; MRC-TSR-2472) Avail: NTIS HC A02/MF A01 CSCL 12/1

The discrete least squares method is convenient for computing polynomial approximations to functions. We investigate the possibility of using this method to obtain polynomial approximants good in the uniform norm, and describe applications both to the case when the function to be approximated is known on a discrete point set only and to the case when we can freely choose the set of least squares nodes. Numerical examples are presented. GRA

N83-32421# Wisconsin Univ., Madison. Center for Mathematics Research.
EXISTENCE OF VISCOSITY SOLUTIONS OF HAMILTON-JACOBI EQUATIONS
Panagiotis E. Souganidis Mar. 1983 64 p refs
(Contract DAAG29-80-C-0041)
(AD-A127691; MRC-TSR-2488) Avail: NTIS HC A04/MF A01 CSCL 21/1

Equations of Hamilton-Jacobi type arise in many areas of application, including the calculus of variations, control theory and differential games. However, nonlinear first order partial differential equations almost never have global classical solutions, and one must deal with generalized solutions. Recently M. G. Crandall and P. L. Lions introduced the class of viscosity solutions of these equations and proved uniqueness within this class. This paper discusses the existence of these solutions under assumptions closely related to the ones which guarantee the uniqueness. GRA

N83-32422# Wisconsin Univ., Madison. Center for Mathematics Research.
AN INTERFACE TRACKING ALGORITHM FOR THE POROUS MEDIUM EQUATION
E. DiBenedetto and D. C. Hoff Mar. 1983 90 p refs Prepared in cooperation with Indiana Univ., Bloomington
(Contract DAAG29-80-C-0041; Grant NSF MCS-83-00293)
(AD-A127685; MRC-TSR-2489) Avail: NTIS HC A05/MF A01 CSCL 12/1

The authors study the convergence of a finite difference scheme for the Cauchy problem for a porous medium equation. The scheme exhibits the following two features. The first is that it employs a discretization of the known interface condition for the propagation of the support of the solution. Thus generated are approximate interfaces as well as an approximate solution. The second feature is that it contains a vanishing viscosity term. The authors prove that both the approximate solution and the approximate interfaces converge to the correct ones. Finally error bounds for both solution and free boundaries are proved in terms of the mesh parameters. GRA

N83-32423# Naval Underwater Systems Center, New London, Conn. Submarine Sonar Dept.
OPTIMUM MULTISENSOR, MULTITARGET TIME DELAY ESTIMATION
Lawrence C. Ng and Y. Bar-Shalom (Connecticut Univ.) 20 Apr. 1983 209 p refs
(AD-A127639; NUSC-TR-6757) Avail: NTIS HC A10/MF A01 CSCL 12/1

This study presents the results of an investigation of the optimum signal processor for passive time delay estimation in a

multisensor, multitarget environment. The target-sensor geometry is assumed stationary over the observation time interval. The performance of the optimum processor in terms of Cramer-Rao Lower Bound is presented. The relation between time delay estimation and localization parameter estimation is explored. The derivation of the optimum processor for joint time delay and power spectral estimation is also presented. Methods for improved time delay estimation in the presence of interference are investigated. Finally, a simple analytical expression for the Cramer-Rao Lower Bound for the joint cross-sensor time delay estimate from M sensor arrays is derived. Author (GRA)

N83-32424# Wisconsin Univ., Madison.
A BOUNDARY VALUE PROBLEM FOR QUASILINEAR DEGENERATE PARABOLIC EQUATIONS Technical Summary Report
Zhuogun Wu Feb. 1983 18 p refs
(Contract DAAG29-80-C-0041)
(AD-A127729) Avail: NTIS HC A02/MF A01 CSCL 12/1

Using the theory of functions of bounded variation, Vol'pert and Hudjaev successfully treated the initial-value problem for a class of degenerate parabolic equations in one space dimension. Of particular interest was their ability to incorporate even the completely degenerate case of a scalar conservation law in the class they treated. The author subsequently treated the first boundary value problem in a similar spirit and generality. The current work shows that analogous results can be obtained for other boundary conditions. As before, regularization is used to obtain existence results for approximate problems. New estimates are obtained on the approximations which allow passage to the limit. GRA

N83-32425# Wisconsin Univ., Madison. Mathematics Research Center.
A SINGULAR PERTURBATION APPROACH FOR THE ANALYSIS OF THE FUNDAMENTAL SEMICONDUCTOR EQUATION Technical Summary Report
Peter L. Markowich (Technical Univ., Vienna), Christian A. Ringhofer, and Siegfried Selberherr (Technical Univ., Vienna) Feb. 1983 55 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A127728; MRC-TSR-2482) Avail: NTIS HC A04/MF A01 CSCL 12/1

This paper is concerned with a singular perturbation analysis of the two-dimensional steady state semiconductor equations and of the usual finite difference scheme consisting of the five point discretization of Poisson's equation and of the Scharfetter-Gummel discretization of the continuity equations. By appropriate scaling the authors transform the semiconductor equations into a singularly perturbed elliptic system with nonsmooth data. The singular perturbation parameter is defined as the minimal Debeye-length of the device under consideration. Singular perturbation theory allows to distinguish between the regions of strong and of weak variation of solutions, so called layers and smooth regions, and to describe solutions qualitatively in these regions. This information is used to analyze the stability and convergence of the discretization scheme. Particular emphasis is put on the construction of efficient grids. It is shown that the Scharfetter-Gummel method is uniformly convergent, i.e., the global error contribution coming form the continuity equations is small when the maximal mesh size is small, independent of the gradient of the solution. Layer jumps are automatically resolved. The five point scheme however is not uniformly convergent. Therefore, the authors present a modification of the five point scheme which is uniformly convergent. GRA

N83-32426# Wisconsin Univ., Madison. Mathematics Research Center.
ON COLLOCATION SCHEMES FOR QUASILINEAR SINGULARITY PERTURBED BOUNDARY VALUE PROBLEMS Technical Summary Report
Christian A. Ringhofer Feb. 1983 34 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A127727; MRC-TSR-2483) Avail: NTIS HC A03/MF A01 CSCL 12/1

Many high-order discretization methods for the solution of two-point boundary value problems for systems of ordinary differential equations are already circulated. However, these methods can behave quite poorly in case the solution has large derivatives, unless severe restrictions on the mesh are imposed. The reason for these restrictions is mainly a stability problem. In this paper a strongly A-stable difference method based on polynomial collocation is developed for a class of quasilinear, singularly perturbed, two-point boundary value problems. Many problems of practical interest are included in this class, for instance the nonlinear deformation of thin beams or one-dimensional models of carrier transport in semiconductor devices. The method combines the advantages of having the same stability properties as the lower order methods which are used already, with the high order of convergence of collocation methods. It is shown that the number of gridpoints (and therefore the amount of computing time and required storage) is of the same order of magnitude as the one required for solving unperturbed problems. GRA

N83-32427# Wisconsin Univ., Madison. Mathematics Research Center.
MALLIAVIN'S CALCULUS AND STOCHASTIC INTEGRAL REPRESENTATIONS OF FUNCTIONALS OF DIFFUSION PROCESSES Technical Summary Report
Daniel Ocone Feb. 1983 26 p refs
(AD-A127726; MRC-TSR-2479) Avail: NTIS HC A03/MF A01 CSCL 12/1

The recent invention of the so-called Malliavin calculus has led to new advances in the analysis of functionals of Brownian motion. Basically, the Malliavin calculus is a method for integrating by parts in function space and with respect to Wiener measure. One version of the theory can be developed through the use of the Clark-Haussmann formulas (Bismut). Another approach uses a second-order, self-adjoint operator on functionals and the natural concept of differentiation in Wiener space, the H-derivative. In this paper, the authors show that this second form of Malliavin's calculus leads to a very simple derivation of Clark's integral representation. This demonstrates the equivalence of the two approaches to Malliavin's calculus and leads to a nice interpretation of Clark's formula. GRA

N83-32428# Naval Research Lab., Washington, D. C.
CYLINDRICAL BESSEL FUNCTIONS FOR A LARGE RANGE OF COMPLEX ARGUMENTS Interim Report
J. P. Mason 29 Apr. 1983 14 p refs
(RR0010841)
(AD-A128049; NRL-8687) Avail: NTIS HC A02/MF A01 CSCL 12/1

The evaluation of Bessel functions of the first and second kinds, covering a wide range of complex arguments and integer orders, is required in the determination of the intensity of acoustic reflection from absorbing bodies. Numerical problems associated with the calculations are discussed, and various means by which these problems have been overcome are explained. The numerical methods used in calculating the bessel functions of the first, second, and third kinds are given, as well as sample results and numerical checks in the form of computer plots and printouts. Author (GRA)

N83-32429# Pittsburgh Univ., Pa. Center for Multivariate Analysis
INFERENCE ON PARAMETERS IN A LINEAR MODEL, A REVIEW OF RECENT RESULTS
Jochen Muller, C. Radhakrishna Rao, and Bimal Kumar Sinha Jan. 1983 21 p refs
(Contract F49620-82-K-0001; AF Proj. 2304)
(AD-A127486; AFOSR-83-0302TR; TR-83-01) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper, in three parts, is a review of recent results on inference on parameters in a linear model. In the first part, the Gauss-Markoff theory is extended to the case when the dispersion matrix of the observable random vector is singular. In the second,

robustness of inference procedures for departures in the design matrix, the dispersion matrix and distributional assumptions about the error components is considered. Finally, the third part introduces concepts of linear sufficiency and completeness in linear models, without making any distributional assumptions.
Author (GRA)

N83-32430# Maryland Univ., College Park. Dept. of Mathematics.
THE ASYMPTOTIC VARIANCE OF HIGHER ORDER CROSSINGS
Benjamin Kedem and George Reed Aug. 1982 21 p refs
(Grants AF-AFOSR-0187-82; AF-AFOSR-0211-80; AF Proj. 2304)
(AD-A127459; MD82-52-BK/GR; TR-82-43; AFOSR-83-0295TR)
Avail: NTIS HC A02/MF A01 CSCL 12/1

The rate of decrease in the variance of higher order crossings is obtained for stationary Gaussian m-dependent sequences. This result provides a fast approximation to the variance of the number of axis crossings of oscillatory processes. In some sense, the authors fill in a gap not answered by the Higher Order Crossings Theorem regarding the monotonicity of higher order crossings.
Author (GRA)

N83-32431# Maryland Univ., College Park. Dept. of Mathematics.
SOME GENERALIZATIONS OF THE RENEWAL PROCESS
Eric Slud and Jan Winnicki Dec. 1982 17 p refs
(Grant AF-AFOSR-0187-82; AF Proj. 2304)
(AD-A127522; AFOSR-83-0294TR; MD82-76-SW; TR-82-65) Avail: NTIS HC A02/MF A01 CSCL 12/1

The greatest success, as well as the most severe limitations, of standard Reliability Theory have been due to its restriction to the study of independent failure-time random variables. Consider the case of Renewal Theory, which in the context of Reliability has led to the characterization of many classes of repair/replacement policies, and which appears to depend crucially on the assumption of independence for times between successive failures. In practical life, it is clear that successive replacements of failed components in a complicated assembly (say, an aircraft) may have some cumulative effect tending to shorten future times between replacements. Additionally, one can imagine that shocks to the system from failures of single components can affect the lifetimes of the remaining components, or even that the age of important components can be reflected in the operating characteristics and therefore in the hazard of failure of the system.
Author (GRA)

N83-32432# Adaptive Sensors, Inc., Santa Monica, Calif.
NEW SYNDROME DECODING TECHNIQUES FOR CONVOLUTIONAL CODES OVER GFq Final Report
I. S. Reed Jan. 1983 40 p refs
(Contract N00019-81-C-0541)
(AD-A127955) Avail: NTIS HC A03/MF A01 CSCL 09/4

This is a final report on a one-year study of techniques for improving the encoding and decoding of error-correcting codes. For the previous three quarters emphasis was given to methods for making the encoding and decoding of Reed-Solomon codes more efficient. These methods included the possibility of using Winograd's fast transforms for transform encoding and decoding of Reed-Solomon codes, and studies for simplifying the arithmetic of the Galois fields used in error-correcting codes. The latter topic led to an investigation of the architecture needed to realize Berlekamp's new bit-serial multiplier. During the last quarter a new syndrome decoding algorithm for convolutional codes (CC) was conceived by the author. In this report this idea is extended to a greater generality.
GRA

N83-32433# Illinois Univ., Chicago. Dept. of Mathematics.
TWO ORTHOGONAL (v/2)X2v F-RECTANGLE FOR ALL EVEN v
A. S. Hedayat and W. T. Federer (Cornell Univ.) Jan. 1983 7 p
(Grant AF-AFOSR-0170-80; AF Proj. 2304)
(AD-A127948; AFOSR-83-0339TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

It is shown how to construct a pair of orthogonal v/2 by 2v rectangles for all even v. Also, it is shown how to construct a set of t pairwise orthogonal v/2 by 2v F-rectangles for all even v for which a set of t pairwise orthogonal Latin squares of order v exists. Some situations where these designs are useful in practice are indicated.
Author (GRA)

N83-32434# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
A TWO-LEVEL PIPELINED SYSTOLIC ARRAY FOR MULTIDIMENSIONAL CONVOLUTION Interim Report
H. T. Kung, Lawrence M. Ruane (ESL Inc.), and David W. L. Yen (ESL Inc.) Nov. 1982 19 p refs
(Contracts F33615-81-K-1539; N00014-76-C-0370;
N00014-80-C-0236; NR Proj. 044-422; NR Proj. 048-659)
(AD-A127544; CMU-CS-83-103) Avail: NTIS HC A02/MF A01 CSCL 09/5

This paper describes a systolic array for the computation of n-dimensional (n-D) convolutions of any positive integer n. Systolic systems usually achieve high performance by allowing computations to be pipelined over a large array of processing elements. To achieve even higher performance, the systolic array of this paper utilizes a second level of pipelining by allowing the processing elements themselves to be pipelined to an arbitrary degree. Moreover, it is shown that as far as orders of magnitude are concerned, the total amount of memory required by the systolic array is no more than that needed by any convolution device that reads in each input data item only once. Thus if only schemes that use the minimum-possible I/O are considered, the systolic array is not only high performance, but also optimal in terms of the amount of required memory.
Author (GRA)

N83-32435# Rochester Univ., N. Y. Graduate School of Management.
SIGNIFICANCE POINTS FOR SOME TESTS OF UNIFORMITY ON THE SPHERE, REVISION
J. Kielson, D. Petrondas, U. Sumita, and J. Wellner Nov. 1982 33 p refs
(Grant AF-AFOSR-0043-79; AF Proj. 2304)
(AD-A128027; AFOSR-8300329TR; WPS-8029) Avail: NTIS HC A03/MF A01 CSCL 12/1

Beran and Gine have proposed several omnibus tests for uniformity on the unit sphere in three dimensional Euclidean space. While several authors have contributed to providing approximate percentage points for the limiting distributions, no tables of the limiting distributions, percentage points thereof, or finite sample distributions or percentage points have been available. In this paper the authors fill this gap by: (1) finding the exact distributions of the statistics of Beran and Gine for $n = 2$; (2) presenting some percentage points for selected small and moderate sample sizes obtained by Monte-Carlo methods; (3) evaluating numerically the cumulative distribution functions and significance points of the limiting distributions via the Laguerre transform method.
GRA

N83-32436# California Univ., Berkeley. Center for Pure and Applied Mathematics.
ANALYSIS OF THE LOOK AHEAD LANCZOS ALGORITHM Ph.D. Thesis
Derek R. Taylor Nov. 1982 84 p refs
(Contract N00014-76-C-0013)
(AD-A128020; PAM-108) Avail: NTIS HC A05/MF A01 CSCL 12/1

The two-sided Lanczos algorithm is known to suffer instability in the form of serious breakdown. This occurs when the associate moment matrix does not permit a triangular factorization. This work uses the notion of a generalized pivot to inexpensively circumvent the breakdown in most cases, with the 2x2 pivot examined in detail. The case where the generalized pivot is of no avail is analyzed, introducing a surprising characterization for that form of serious breakdown.
Author (GRA)

N83-32437# Naval Postgraduate School, Monterey, Calif. Dept. of Operations Research.
STATIONARY EXPONENTIAL TIME SERIES: FURTHER MODEL DEVELOPMENT AND A RESIDUAL ANALYSIS
P. A. W. Lewis (Birmingham Univ.) and A. J. Lawrence Apr. 1983 46 p refs
(Grant NR-42-284; RR0140501)
(AD-A128347; NPS-55-83-008) Avail: NTIS HC A03/MF A01 CSCL 12/1

A second order autoregressive process in exponential variables, NEAR(2), is established: the distributional assumptions involved in this model highlight is a very broad four parameter structure which combines five exponential random variables into a sixth exponential random variable. The dependency structure of the NEAR(2) process beyond and including autocorrelations is explored using some new ideas on residual analysis for non-normal processes with autoregressive correlation structure. Other applications of the exponential structure are considered briefly. These include exponential time series with negative correlation and exponential time series with mixed autoregressive-moving average structure. An application to the analysis of a set of wind speed data is included.
Author (GRA)

N83-32438# North Carolina Univ., Chapel Hill. Center for Stochastic Processes.
LIMIT LAWS FOR THE MAXIMUM OF WEIGHTED AND SHIFTED I.I.D. RANDOM VARIABLES
D. J. Daley and Peter Hall (Australian National Univ.) Feb. 1983 34 p refs
(Contract F49620-82-C-0009; AF Proj. 2304)
(AD-A128359; AFOSR-83-0415TR; TR-26) Avail: NTIS HC A03/MF A01 CSCL 12/1

The class G of limit laws for the sequence maxium. M sub u congruent to max (X subs o, ..., X sub n-1) of independent identically distributed random variables X sub o. X sub 1, ... is extended to limit laws for weighted sequences.
Author

N83-32439# Maryland Univ., College Park. Numerical Analysis Lab.
AN ANALYSIS OF A FINITE ELEMENT METHOD FOR CONVECTION-DIFFUSION PROBLEMS. PART 2: A POSTERIORI ERROR ESTIMATES AND ADAPTIVITY Final Report
W. G. Szymczak and I. Babuska Mar. 1983 51 p refs 2 Vol.
(Contract N00014-77-C-0623)
(AD-A128261; BN-1002-Pt-2) Avail: NTIS HC A03/MF A01 CSCL 12/1

A posteriori error estimates are derived for the finite element method presented in Part I. These estimates are proven to have the property that the effectivity index theta = (error estimate/true error) converges to one as the maximum mesh size goes to zero. An adaptive mesh refinement strategy is based on equilibriating local error indicators whose sum comprises the global error estimate. Numerical results show that theta is nearly one even on coarse meshes, and that optimal meshes are created by the adaptive procedure. The successful solution of a non linear problem-modelling flow through an expanding duct, makes evident the robustness of the method.
Author (GRA)

N83-32440# Maryland Univ., College Park. Numerical Analysis Lab.
AN ANALYSIS OF A FINITE ELEMENT METHOD FOR CONVECTION-DIFFUSION PROBLEMS. PART 1: QUASI-OPTIMALITY Final Report
W. G. Szymczak and I. Babuska Mar. 1983 61 p refs 2 Vol.
(Contract N00014-77-C-0623)
(AD-A128260; BN-1001-Pt-1) Avail: NTIS HC A04/MF A01 CSCL 12/1

A detailed analysis is performed for a finite element method applied to the general one-dimensional convection diffusion problem. Piecewise polynomials are used for the trial space. The test space is formed by locally projecting L-spline basis functions onto upwinded polynomials. The error is measured in the LP mesh dependent norm. The method is proven to be quasi-optimal (yielding nearly the best approximation from the trial space), provided that the input data is piecewise smooth. This assumption is usually observed in practice. These results are used to establish a posteriori error estimates and an adaptive mesh refinement strategy in Part II of this series (35).
Author (GRA)

N83-32441# Naval Postgraduate School, Monterey, Calif. Anti-submarine Warfare Academic Group.
A RANDOM TOUR PROCESS OF KNOWN LENGTH BETWEEN KNOWN END POINTS
R. N. Forrest Jan. 1983 26 p refs
(Contract N00030-83-AF-31319)
(AD-A128243; NPS71-83-001) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report describes a two dimensional stochastic process and a program for its simulation. The process can be considered to describe a random track of predetermined length that originates and terminates at predetermined end points. The process is a modification of a process that is without the length and termination constraints. A particular process is defined by the track length, the maximum expected track segment length and the distance between the end points. For motion at a constant speed, the track length constraint is equivalent to a transit time constraint. In Section 2, the process and the unmodified process are described and some of their characteristics are discussed. In Section 3, the simulation program is described. By using the program, graphs and data can be produced that represent realizations of the process. The program, which is written in BASIC, is for an HP-85.
GRA

N83-32442# Wisconsin Univ., Madison. Center for Mathematics Research.
QUASIRESONANCE OF LONG LIFE
R. E. Meyer Jan. 1983 35 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-80-01960)
(AD-A127763; MRC-TSR-2466) Avail: NTIS HC A03/MF A01 CSCL 12/1

Schroedinger's equation for a spherically symmetrical potential with central well surrounded by a barrier is studied in the tunneling range of energies, where it possesses states of very long life and correspondingly large, resonant response. The analysis is based on asymptotics with respect to the long life and large response, related to asymptotics of exponential precision, and leads to simple predictions for life and response.
Author (GRA)

N83-32443# Wisconsin Univ., Madison. Center for Mathematics Research.
SELF-REFLECTING SKEW POLYGONS AND POLYTOPES IN THE 4-DIMENSIONAL HYPERCUBE
I. J. Schoenberg Jan. 1983 29 p refs
(Contract DAAG29-80-C-0041)
(AD-A127762; MRC-TSR-2467) Avail: NTIS HC A03/MF A01 CSCL 12/1

In previous papers the author dealt with certain extremum problems for billiard ball motions in the hypercube gamma sub n of r sub n. Here he studies in greater detail the case when n = 4. The resuls are graphically described. The author also made 3-dimensional models corresponding to these figures out of thin wooden sticks.
GRA

N83-32444# Wisconsin Univ., Madison. Center for Mathematics Research.
ON CONFIDENCE INTERVALS FOR CYCLIC REGENERATIVE PROCESSES
Peter W. Glynn Jan. 1983 16 p refs
(Contract DAAG29-80-C-0041)
(AD-A127761; MRC-TSR-2469) Avail: NTIS HC A02/MF A01 CSCL 12/1

Simulation is a commonly used method of analysis for studying complex stochastic systems. Often, the parameter of interest to the simulator can be estimated by more than one quantity. When more than one estimator exists, it is desirable to use the more stable estimate, namely the one with the lesser variance. In this

paper, the authors consider a class of stochastic processes which enjoy cyclic regenerative structure such systems often arise, for example, in analysis of queues. They study a family of estimators and determine precise conditions under which the estimators are asymptotically valid. They also obtain a closed-form solution for the minimum variance estimate in the family, and prove that this estimator will often be superior to the standard regenerative estimator for the simulation. GRA

N83-32445# Wisconsin Univ., Madison. Center for Mathematics Research.
DIFFERENTIAL GAMES AND REPRESENTATION FORMULAS FOR SOLUTIONS OF HAMILTON-JACOBI-ISAACS EQUATIONS
L. C. Evans (Maryland Univ.) and P. E. Souganidis Mar. 1983 50 p refs Sponsored in part by the Alfred P. Sloan Foundation
(Contract DAAG29-80-C-0041; Grant NSF MCS-81-02846)
(AD-A127758; MRC-TSR-2492) Avail: NTIS HC A03/MF A01 CSCL 12/1

Recent work by the authors and others has demonstrated the connections between the dynamic programming approach for two-person, zero-sum differential games and the new notion of viscosity solutions of Hamilton-Jacobi PDE, (Partial Differential Equations). The basic idea is that the dynamic programming optimality conditions imply that the values of a two-person, zero-sum differential game are viscosity solutions of appropriate PDE. This paper proves the above, when the values of the differential games are defined following Elliott-Kalton. This results in a great simplification in the statements and proofs, as the definitions are explicit and do not entail any kind of approximations. Moreover, as an application of the above results, the paper contains a representation formula for the solution of a fully nonlinear first-order PDE. This is then used to prove results about the level sets of solutions of Hamilton-Jacobi equations with homogeneous Hamiltonians. These results are also related to the theory of Huygen's principle and geometric optics. GRA

N83-32446# Wisconsin Univ., Madison. Center for Mathematics Research.
SOME ASPECTS OF CRITICAL POINT THEORY
Paul H. Rabinowitz Jan. 1983 50 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-81-10556)
(AD-A127757; MRC-TSR-2465) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper contains a slightly expanded version of the series of lectures given by the author at the Third International Symposium on Differential Equations and Differential Geometry held in Changchun, China during parts of August and September of 1982. The lectures describe some of the results obtained using minimax methods in critical point theory during the past several years and give applications of the abstract results to differential equations. In particular existence theorems are obtained for many boundary value problems for semilinear elliptic partial differential equations. GRA

N83-32447# Wisconsin Univ., Madison. Center for Mathematics Research.
STABLE VISCOSITY MATRICES FOR SYSTEMS OF CONSERVATION LAWS
Andrew J. Majda (California Univ.) and Robert Pego Mar. 1983 44 p refs
(Contract DAAG29-80-C-0041; Grants NSF MCS-79-27062; NSF MCS-81-02360; ARO-483964-25530)
(AD-A127759; MRC-TSR-2491) Avail: NTIS HC A03/MF A01 CSCL 12/1

Many equations of mathematical physics take the form of nonlinear hyperbolic systems of conservation laws. With small dissipative effects neglected, typically smooth solutions must develop discontinuities (shocks) in finite time. Reincorporating dissipation helps select those discontinuities which are physically meaningful. For this purpose, many different sorts of dissipation will do; in particular, the physical viscosity is typically degenerate and not covenient. In this paper the authors provide a thorough understanding of what sorts of second order viscosity terms smooth the physical discontinuities. A natural class of admissible viscosity terms is determined based on a simple linearized stability condition. GRA

N83-32448# Naval Postgraduate School, Monterey, Calif. Dept. of Operations Research.
TWO MODELS OF TIME CONSTRAINTED TARGET TRAVEL BETWEEN TWO ENDPOINTS CONSTRUCTED BY THE APPLICATION OF BROWNIAN MOTION AND A RANDOM TOUR M.S. Thesis
William Justin Comstock Mar. 1983 112 p refs
(AD-A127805) Avail: NTIS HC A06/MF A01 CSCL 12/1

A target must choose a path between some origin and destination. The total travel time and the target speed are specified, and the target wishes to maximize the randomness of its track subject to the spatial and temporal constraints. Measures of effectiveness are developed against which the randomness of any path-producing method can reasonably be judged. Previous investigations into the scenario are reviewed and two models are developed, one using a random tour with drift and the other derived from Brownian motion. Statistics generated by Monte Carlo simulations for both models are compared. While the Brownian motion derived process is not always under perfect control of the constraints, if the timed arrival constraint may be slightly violated then that process performs better against the measures of effectiveness and is easier for a target to execute than is the random tour with drift. GRA

N83-32449# North Carolina Univ., Chapel Hill. Center for Stochastic Processes.
ON A PROBLEM CONCERNING SPACINGS
Shihong Cheng (Peking Univ.) Feb. 1983 14 p refs
(Contract F49620-82-C-0009; AF Proj. 2304)
(AD-A128509; AFOSR-83-0420TR; TR-27) Avail: NTIS HC A02/MF A01 CSCL 12/1

The exact distribution of M sub n is given. The behavior of certain distribution functions, called refibunacci distribution junction; is discussed. Author

N83-32450# Systems Technology, Inc., Hawthorne, Calif.
ELEMENTS OF SIMULATION ERROR ANALYSIS Final Report, 2 Mar. 1981 - 22 Feb. 1982
Richard F. Whitbeck Wright-Patterson AFB, Ohio AFWAL Jun. 1982 183 p refs
(Contract F33615-81-C-3606; AF Proj. 2304)
(AD-A128497; AFWAL-TR-82-3022; TR-1173-1) Avail: NTIS HC A09/MF A01 CSCL 12/1

The past decade has seen an order-of-magnitude increase in reliance on fixed and moving based digital simulation for research and training in all types of aircraft. Along with this increase there has been a growing need to identify and analyze those anomalies introduced by digital computation which can adversely affect the fidelity of a simulation. Those anomalies arise for a variety of reasons, the most important being: (1) two or more computers required in a large simulation, each working in its own frametime, (2) serial processing (calling) of subroutines which can cause skewed or stale data effects, (3) throughput delays, and (4) effects of various integration algorithms. This report develops several key tools useful for the analysis of computer algorithms working in a skewed data, multi-rate environment and thus makes it possible to analytically investigate the anomalies mentioned above. Toward this end, numerous case studies, based upon existing computer simulations, are presented which specifically treat the independent processor problem and the unintentional filtering introduced by the serial call of subroutines. Author (GRA)

N83-32451# California Univ., Livermore. Lawrence Livermore Lab.
PRELIMINARY INVESTIGATION OF INTERCONNECTED SYSTEMS INTERACTIONS FOR THE SAFETY INJECTION SYSTEM OF INDIAN POINT-3
H. P. Alesso, D A. Lappa, C F. Smith (Science Applications, Inc.),

and I. J. Sacks (Analytic Information Processing, Inc.) 4 Mar. 1983 54 p refs
(Contract W-7405-eng-48)
(DE83-009172; UCID-19473) Avail: NTIS HC A04/MF A01

The rich diversity of ideas and techniques for analyzing interconnected systems interaction has presented the NRC with the problem of identifying methods appropriate for their own review and audit. This report presents the findings of a preliminary study using the Digraph Matrix analysis method to evaluate interconnected systems interactions for the safety injection system of Indian Point-3. The analysis effort in this study was subjected to NRC constraints regarding the use of Boolean logic, the construction of simplified plant representations or maps, and the development of heuristic measures as specified by the NRC. The map and heuristic measures were found to be an unsuccessful approach. However, from the effort to model and analyze the Indian Point-3 safety injection system, including Boolean logic in the model, singleton and doubleton cut-sets were identified. It is recommended that efforts excluding Boolean logic and utilizing the NRC heuristic measures not be pursued further. DOE

N83-32452# Sandia Labs., Albuquerque, N. Mex.
ALGEBRAIC APPROXIMATION OF EVENT TREE SEQUENCES
R. B. Worrell 1982 6 p refs Presented at Reliability and Maintainability Symp., Orlando, Fla., 25 Jan. 1983
(Contract DE-AC04-76DP-00789)
(DE82-022169; SAND-82-1273C; CONF-830106-1) Avail: NTIS HC A02/MF A01

An event tree sequence XY bar is often approximated by X, i.e., by retaining only system failure events in the sequence. This paper describes a decomposition of the formula for X that produces an approximation X2 to Xy bar. It is shown that XY bar $<$ or $=$ X2 $<$ or $=$ X, which means that X2 is an upper bound on XY bar that is at least as good as X. In general, the decomposition of X required to obtain an exact expression X2 - XY bar is difficult, but any decomposition that can be achieved yields an upper bound X2 $<$ or $=$ X. An algorithm that uses disjunctive normal forms of X and Y to produce a particular upper bound X2 is defined. This algorithm has been implemented and some observations about its use in the Interim Reliability Evaluation Program (IREP) are presented. DOE

N83-32453# Los Alamos Scientific Lab., N. Mex. Atmospheric Sciences Group.
EULERIAN-LAGRANGIAN RELATIONSHIPS IN MONTE CARLO SIMULATIONS OF TURBULENT DIFFUSION
J. T. Lee and G. L. Stone 1983 6 p refs Presented at the 6th Am. Meteorol. Soc. Symp. on Turbulence and Diffusion, Boston, 22-25 Mar. 1983 Sponsored in cooperation with Army Atmospheric Sciences Lab.
(Contract W-7405-eng-36)
(DE83-003490; LA-UR-82-3240; CONF-830307-5) Avail: NTIS HC A02/MF A01

The results of this study show that Monte Carlo simulations of diffusion in homogeneous turbulence can be formulated in terms of the Eulerian space-time velocity autocorrelation function. Numerical results obtained using the approach agree with results obtained by Taylor (1921) using the Lagrangian autocorrelation function. Use was made of the equivalence of the Lagrangian and Eulerian Monte Carlo approaches to derive analytic relations between the Lagrangian integral time scale and the Eulerian integral space and time scales. These analytic results were verified by comparison to Monte Carlo simulations and to other theoretical results. They are in general agreement with many existing theories and semiempirical relations. DOE

N83-32454# Los Alamos Scientific Lab., N. Mex. Atmospheric Sciences Group.
USE OF EULERIAN INITIAL CONDITIONS IN A LAGRANGIAN MODEL OF TURBULENT DIFFUSION
J. T. Lee and G. L. Stone 1983 6 p refs Presented at the 6th Am. Meteorol. Soc. Symp. on Turbulence and Diffusion, Boston, 22-25 Mar. 1983 Sponsored in cooperation with Army Atmospheric Sciences Lab.
(Contract W-7405-eng-36)
(DE83-003479; LA-UR-82-3034; CONF-830307-4) Avail: NTIS HC A02/MF A01

Simple analytic solutions were obtained for relative diffusion and meandering of puffs and plumes based upon the random force theory of turbulent diffusion. These solutions assume that the initial velocities of the tracer particles are identical to the turbulent field velocities at the source location. The spatial and temporal correlation of these velocities are, therefore, determined by the Eulerian space-time autocorrelation function, and the appropriate ensemble average can be calculated if this correlation function is known. These solutions exhibit many of the known features of relative diffusion and are in general agreement with similarity theory for the inertial subrange. The solutions are presented in dimensionless form and are applicable to turbulent diffusion on any scale. To apply these results to actual experiments, the magnitude of the Eulerian integral length scale L, and the Eulerian and Lagrangian integral time scale t/sub E/ and t/sub L/ must be known. These can be determined only from experimental data. DOE

N83-32455# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
MATHEMATICAL REPRESENTATION OF SIZE AND ELECTRONIC FACTORS
Leo Brewer Nov. 1982 7 p refs Presented at the 6th Intern. Symp. on the Sci. Basis for Radioactive Waste Management, Boston, 1-4 Nov. 1982
(Contract DE-AC03-76SF-00098)
(DE83-004182; LBL-15220; CONF-821107-36) Avail: NTIS HC A02/MF A01

The relative sizes of the atoms and their electronic configurations are important factors in determining the thermodynamic properties of metallic phases. The regular solution model provides for an asymmetric excess Gibbs energy when there is a size difference, but the actual degree of asymmetry does not correspond to crystallographic sizes. This is due in part to the effect of electronic configurations upon the asymmetry of the Gibbs energy. The Hume-Rothery Rules indicate that the bcc, hcp, and ccp structures are associated with characteristic outer-shell electron per atom concentrations. The electronic factors require modification of the usual definition of internal pressure as used in the regular solution theory. Rather than using the energy of vaporization to the valence state atom, which has the same electronic configuration as in the condensed state, is a more appropriate measure of the degree of cohesion and the internal pressure. DOE

N83-32456# Princeton Univ., N. J. Dept. of Statistics.
LEAST ABSOLUTE DEVIATIONS REGRESSION
Peter Bloomfield 1982 11 p refs Presented at the 5th Natl. Symp. on Probability and Statistics, Sao Paulo, Brazil, 26 Jul. 1982
(Contract DE-AC02-81ER-10841)
(DE83-004424; DOE/ER-10841/5; CONF-820763-1) Avail: NTIS HC A02/MF A01

Some fast algorithms have recently been constructed for fitting regression equations by the Least Absolute Deviations criterion. The basis for these algorithms is discussed, and the geometry of the problem is described. The difficulties caused by degeneracy of the problem and nonuniqueness of the solutions are also mentioned. DOE

N83-32457# Los Alamos Scientific Lab., N. Mex.
DEVELOPMENT AND APPLICATION OF THE DISCRETE ORDINATES-TRANSFER MATRIX HYBRID METHOD FOR DETERMINISTIC STREAMING CALCULATIONS Thesis
Bradley Allan Clark May 1982 127 p refs
(Contract W-7405-eng-36)
(DE82-017387; LA-9357-T) Avail: NTIS HC A07/MF A01

Integral transport theory is used to compute transfer matrix elements for neutral particle streaming through r-z rectangular voids. The transfer matrix is utilized in a hybrid method; it interfaces

with a conventional discrete ordinates calculation outside the void. Since the hybrid interface is accomplished within the inner iteration of an existing discrete ordinates code, standard sweeping schemes used in SN codes are not adversely affected. The resulting transfer matrix is independent of the multigroup energy structure used in a calculation. Further, the transfer matrix is not affected by changes in materials or cross sections outside the void. For these reasons, once a transfer matrix is calculated it can be used in a wide variety of problems containing a similar void. In this study, the transfer matrix hybrid, standard discrete ordinates, and Monte Carlo methods are applied to two sample problems to compare the accuracy of these methods. The Monte Carlo results are considered correct in order to compute errors in the deterministic calculations. DOE

N83-32458# Bonn Univ. (West Germany). Inst. fuer Angewandte Mathematik.
QUASILINEAR ELLIPTIC-PARABOLIC DIFFERENTIAL EQUATIONS
Hans Wilhelm Alt and Stephan Luckhaus (Heidelberg Univ.) Jan. 1983 57 p refs Submitted for publication Sponsored by Deutsche Froschungsmeinschat
(PREPRINT-568) Avail: NTIS HC A04/MF A01

An initial boundary value problem for systems of quasilinear elliptic-parabolic partial differential equations is studied. Application includes nonsteady filtration of incompressible fluids in a porous medium. The existence of a weak solution and regularity and uniqueness results are proved. The method is also applied to variational inequalities and Stefan problems. Author (ESA)

N83-32459# Sheffield Univ. (England). Dept. of Control Engineering.
ROBUST SAMPLED REGULATORS FOR STABLE SYSTEMS FROM PLANT STEP DATA
D. H. Owens and A. Chotai Jan. 1983 19 p refs
(Grant SRC-GR/B/23250)
(RR-213) Avail: NTIS HC A02/MF A01

A process model for the design of integrating regulators for stable systems with monotone step responses is extended to cover the case of multivariable systems with nonmonotonic step responses. The technique provides a simple way of designing robust regulators by elementary graphical analysis of plant step data. The background theory is provided with applications to design with second and higher order models. Increase of sample rates possible in the original design by a second order deadheat approximate plant model is outlined. Author (ESA)

N83-32460# Sheffield Univ. (England). Dept. of Control Engineering.
SIMPLE MODEL ORDER REDUCTION BY TRUNCATION WITH PERFORMANCE VERIFICATION BY FAST DIGITAL SIMULATION
A. S. Morris Mar. 1983 9 p refs
(RR-217) Avail: NTIS HC A02/MF A01

The use of interactive digital simulation languages in testing the performance of reduced order models produced by a truncation method is demonstrated. The pole truncation techniques are simple and fast while digital simulation provides a means for testing the transient and steady state performance of reduced models. A tenth order analytical model of an electric furnace electrode controller was successfully reduced to a third order model. The characteristics of the step response of the various lower order models produced by pole truncation are obtained, allowing the lowest order model with satisfactory performance to be readily chosen. In the demonstration case the response time of the controller is accurately maintained by the low order models down to order three. Author (ESA)

N83-32320# Mathematisch Centrum, Amsterdam (Netherlands).
SYMMETRISABLE OPERATORS AND MINIMAL FACTORIZATION
M. A. Kaashoek From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 27-38 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

N83-32325# Mathematisch Centrum, Amsterdam (Netherlands).
INTEGRAL OPERATORS
A. R. Schep From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 81-91 refs Sponsored in part by the South Carolina Univ. Research and Productive Scholarship Fund (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

N83-32326# Mathematisch Centrum, Amsterdam (Netherlands).
THE BACKGROUND TO CAUCHY'S DEFINITION OF THE INTEGRAL
F. Smithies From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 93-100 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

N83-32328# Mathematisch Centrum, Amsterdam (Netherlands).
COMPACT OPERATORS
W. K. Vietsch From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 113-121 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

N83-32330# Grenoble Univ. (France).
INVARIANTS OF A MAXIMAL UNIPOTENT SUBGROUP OF A SEMI-SIMPLE GROUP [INVARIANTS D'UN SOUS-GROUPE UNIPOTENT MAXIMAL D'UN GROUPE SEMI-SIMPLE]
Michel Brion *In its* Ann. of the Fourier Inst., v. 33, no. 1 1983 p 1-27 refs In FRENCH; ENGLISH summary (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

N83-32332# Pisa Univ. (Italy). Inst. de Matematica.
THE THEOREM OF SEMI-PROPER COMPLEXIFICATION [LE THEOREME DE COMPLEXIFICATION SEMI-PROPRE]
E. Fortuna and M. Galbiati *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 53-65 refs In FRENCH; ENGLISH summary (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

N83-32334# Paris-Sud Univ., Orsay (France). Dept. of Mathematiques.
SYSTEMS OF DIFFERENCE-DIFFERENTIAL EQUATIONS [SUR LES SYSTEMS D'EQUATIONS DIFFERENCE-DIFFERENTIELLES]
C. A. Berenstein, B. A. Taylor (Michigan Univ., Ann Arbor), and A. Yger (Ecole Polytechnique) *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 109-130 refs In FRENCH; ENGLISH summary (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

N83-32335# Jochi Univ., Tokyo (Japan). Dept. of Mathematics.
CHARACTERISTIC CAUCHY PROBLEMS AND SOLUTIONS OF FORMAL POWER SERIES
Sunao Ouchi *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 131-176 refs (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

N83-32336# Kyoto Univ. (Japan). Dept. of Mathematics.
ON CONDITION (A SUB F) OF A STRATIFIED MAPPING
Satoshi Koike *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 185-194 refs (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

N83-32337# Dijon Univ. (France). Lab. de Topologie.
THE DENSITY OF THE LEAVES OF CERTAIN PFAFF EQUATIONS WITH TWO VARIABLES [DENSITE DES FEUILLES DE CERTAINES EQUATIONS DE PFAFF A 2 VARIABLES]
Dominique Cerveau *In* Grenoble Univ. Ann. of the Fourier Inst.,

v. 33, no. 1 1983 p 185-194 refs In FRENCH; ENGLISH summary (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

N83-32339# National Inst. for Scientific and Technical Creation, Bucharest (Romania). Dept. of Mathematics.
DEGREE OF THE FIBERS OF AN ELLIPTIC FIBRATION
Alexandru Buium *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 269-276 refs (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

N83-32340# Pasteur (Louis) Univ., Strasbourg (West Germany). Inst. de Recherche Mathematique Avancee.
FIBER COBORDISM AND APPROXIMATION OF A SINGULAR SUBMANIFOLD BY C(INFINITY) [COBORDISME FIBRE ET APPROXIMATION D'UNE SOUS-VARIETE SINGULIERE PAR DER SOUS-VARIETES C INFINITE]
Andre Didierjean *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 277-306 refs In FRENCH; ENGLISH summary (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N83-32461# Purdue Univ., Lafayette, Ind. Dept. of Statistics.
ON SUBSET SELECTION PROCEDURES FOR THE LARGEST MEAN FROM NORMAL POPULATIONS HAVING A COMMON KNOWN COEFFICIENT OF VARIATION
Shanti S. Gupta and Ashok K. Singh Mar. 1983 20 p refs Sponsored in part by Mexico Inst. of Mining and Technology.
(Contract N00014-76-C-0455)
(AD-A127136; TR-83-6) Avail: NTIS HC A02/MF A01 CSCL 12/1

The problem of selecting a subset of k normal populations which includes the population associated with the largest mean is considered for the situation in which the normal populations have a common known coefficient of variation. Subset selection rules based on best asymptotically normal (BAN) estimators of the mean have been studied in the literature and tables based on large sample theory for implementing these rules exist. The authors have compared these rules to a selection rule based on sample variances, and limited study suggest that, when n is large, the difference between the rules based on BAN estimates and the variance rule, in terms of the expected proportion of the selected subset, is minimal. Moreover, since the exact distribution theory for BAN estimates is too complicated, and these BAN estimates are much harder to compute than the sample variances, the selection rule based on the sample variances may be preferred. Author (GRA)

N83-32462# Texas Univ., Austin. Center for Cybernetic Studies.
THE ENTROPIC PENALTY APPROACH TO STOCHASTIC PROGRAMMING
A. Ben-Tal Feb. 1983 42 p refs
(Contracts N00014-82-K-0295; MDA903-81-C-0365)
(AD-A127920; CCS-RR-454) Avail: NTIS HC A03/MF A01 CSCL 12/1

A new decision-theoretic approach to Nonlinear Programming Problems with stochastic constraints is introduced. The Stochastic Program (SP) is replaced by a Deterministic Program (DP) in which a term is added to the objective function to penalize solutions which are not feasible in the mean. The special feature of the author's approach is the choice of the penalty function P sub E, which is given in terms if the relative entropy functional, and is accordingly called entropic penalty. It is shown that P sub E has properties which make it suitable to treat stochastic programs. Some of these properties are derived via a dual representation independent. The dual representation is also used to express the Deterministic Problem (DP) as a saddle function problem. For problems in which the randomness occurs in the rhs of the constraints, it shown that the dual problem of (DP) is equivalent to Expected Utility Maximization of the classical Lagrangian dual function of (SP), with the utility being of the constant-risk-aversion type. Finally, mean-variance approximations of P sub E and the induced Approximate Deterministic Program are considered. GRA

N83-32463# City Coll. of the City Univ. of New York. Dept. of Mathematics.
EXPONENTIAL APPROXIMATIONS FOR TWO CLASSES OF AGING DISTRIBUTIONS
Mark Brown and Guangping Ge Feb. 1983 16 p refs
(Grant AF-AFOSR-0024-82; AF Proj. 2304)
(AD-A127924; CUNY-MB2-TR-82-02-AFOSR; AFOSR-83-0318TR)
Avail: NTIS HC A02/MF A01 CSCL 12/1

If a random variable is exponentially distributed with microns = EX and microns 2 = EX2, then microns 2 = 2 microns squared. Defining rho determinant u(2)/2 micron squared minus 1, it is tempting to conjecture that under mild restrictions a distribution with small rho is approximately exponential. That restrictions are needed is seen by the example, Pr(X = 0) = Pr(X - 1) = 1/2, for which rho = 0. The scale invariant quantity, rho, was suggested by Keilson. It has an interesting interpretation. Define G(x) = micron 1/minus x integral (x,0)/minus negative F (s)ds, the stationary renewal distribution corresponding to F. Then microns G = microns 2/2 microns and rho = determinant micron(G)/micron minus 1. The parameter rho is thus the scaled (by micron) distance between micron and micron G. For F exponential, F = G and thus micron = micron G. GRA

N83-32464# Wisconsin Univ., Madison. Center for Mathematics Research.
A SMALL SAMPLE EVALUATION OF A BAYESIAN DESIGN METHOD FOR QUANTAL RESPONSE MODEL
Tom Leonard Feb. 1983 14 p ref
(Contract DAAG29-80-C-0041)
(AD-A127942; MRC-TSR-2478) Avail: NTIS HC A02/MF A01 CSCL 12/1

The author proposes a design measure which may be used sequentially to choose the next dose level in a linear logistic quantal response model for bioassay. His design measure averages the posterior distribution of the effective dose over those ED(effect dose) values which are regarded as important. In this evaluation the mode of the design density is used as the next design point, and it is supposed that all ED values between ED 60 and ED 90 are equally important. After ten initial badly designed observations, it is shown that only 20 further, well designed, observations are needed to obtain a design efficiency of about 82%, and an estimated response curve which lies at a maximum of an estimated ED points from the true curve, for all ED values lying between ED 60 and ED 90. If more observations are taken then the design efficiency increases steadily, but it is difficult to increase the accuracy of estimation without either taking many more observations, or by pushing the design points outside the appropriate region. However, within the design region, chosen by any recommended procedure, the method promises excellent robustness, with respect to possible inadequacies in the model, whilst outlying design points would not provide such robustness. Author (GRA)

N83-32465# Wisconsin Univ., Madison. Center for Mathematics Research.
BAYESIAN MODELS FOR RESPONSE SURFACES OF UNCERTAIN FUNCTIONAL FORM
David M. Steinberg Jan. 1983 79 p refs
(Contract DAAG29-80-C-0041)
(AD-A127703; MRC-TSR-2474) Avail: NTIS HC A05/MF A01 CSCL 12/1

Experimental response functions are often approximated by simple empirical functions such as polynomials. Several methods for modeling such responses which take into account this approximate nature are described and are shown to be essen-

tially equivalent. The models all involve a Bayesian analysis which reflects prior experimental belief about the ability of the empirical approximation to represent the true response function. The models are also related to Kalman filters. Implications of the models for statistical inference are examined with particular attention to estimating the response function. Numerical examples help illustrate the models. A general predictive check is developed to examine the consistency of model with the observed data. GRA

N83-32466# Wisconsin Univ., Madison. Center for Mathematics Research.
ESTIMATION OF A FILTERED MARKED POISSON PROCESS FROM NOISY OBSERVATIONS WITH APPLICATIONS TO SIGNAL PROCESSING
Dennis D. Cox and John E. Ehrenberg (APL) Mar. 1983 41 p refs
(Contracts N00014-81-K-0095; DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A127692; MRC-TSR-2496) Avail: NTIS HC A03/MF A01 CSCL 12/1

The problem of estimating the arrival times, amplitudes, and phases of an unknown number of signals in noise is treated. The signals are assumed to have a common, known waveform. A Bayesian model using a Poisson prior for the arrival times is specified, and a real time algorithm for computing the posterior mode is developed. Alternatively, the procedure may be looked upon as a penalized likelihood estimator with a penalty team which is a generalized form of Akaike's Information Criterion. Simulation results are presented which show that this approach can improve over classical, linear methods. GRA

N83-32467# Texas A&M Univ., College Station. Inst. of Statistics.
FUN.STAT QUANTILE APPROACH TO TWO SAMPLE STATISTICAL DATA ANALYSIS
Emanuel Parzen Apr. 1983 55 p refs
(Contract DAAG29-83-K-0051; Texas-A&M Proj. 4858)
(AD-A127672; ARO-20140.1-MA; TR-A-21) Avail: NTIS HC A04/MF A01 CSCL 12/1

FUN.STAT is a name proposed to describe a synthesis of statistical reasoning which combines quantiles and quantile-densities, information and entropy, and functional statistical inference. This paper describes a FUN.STAT approach to the problem of statistical data analysis of two random samples, respectively representing two populations of interest. It is composed of four parts. Part 1 describes how conventional approaches to two sample problems, including representations of linear rank statistics, are equivalent to functionals of a stochastic process. Part 2 motivates the autoregressive density estimation approach to the problem of functional statistical inference of this stochastic process and states several conjectures concerning the properties of the density estimation approach. Part 3 outlines heuristic derivations of the asymptotic distribution theory of the process. Part 4 provides a summary and an example, using TWOSAM which is a computer program for autoregressive two sample statistical data analysis; it has been implemented as a FORTRAN program and as a SAS procedure. GRA

N83-32468# Naval Ocean Systems Center, San Diego, Calif.
BAYR, A DATA ASSOCIATION ALGORITHM BASED ON A BAYESIAN RECURSION Final Report, Oct. 1981 - Sep. 1982
M. J. Shensa 15 Nov. 1982 78 p refs
(SF33341401)
(AD-A127460; NOSC/TR-848) Avail: NTIS HC A05/MF A01 CSCL 12/1

Standard tracking algorithms involve processing measurements associated with a given target and forming an estimate of the target's state. However, many practical situations also include an uncertainty regarding the origin of the data. In the most general case one is faced with the problem of tracking targets in a multinsensor multitarget environment, possibly including highly dissimilar data types ranging from acoustic measurements to visual sightings. The term data association, as applied here, refers to the partitioning of a set of measurements according to their sources. Each such partition is termed a hypothesis, and the object is to find the best hypothesis. In this report the authors describe an algorithm which is intended to provide a general framework for data association. It is cast in a Bayesian context; that is, the relative merits of the hypotheses are evaluated in terms of their aposteriori probabilities. However, the presentation includes the development of a general data and scoring structure which should find application in most schemes which evaluate hypotheses recursively. In addition, a detailed model is provided for the case of bearings-only measurements in a convergence zone environment. The methodology used in developing this restricted case is considered a prototype for future models. Author (GRA)

N83-32469# Illinois Univ., Chicago. Dept. of Mathematics, Statistics, and Computer Science.
A CLASS OF MULTIVARIATE NEW BETTER THAN USED PROCESSES
Emed El-Neweihi Dec. 1982 14 p refs
(Grant AF-AFOSR-0170-80; AF Proj. 2304)
(AD-A127535; AFOSR-83-0297TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

A multivariate version of the univariate new better than used (NBU) processes, due to El-Neweihi, Proschan, and Sethuraman is introduced. Closure properties of this new class of multivariate NBU (MNBU) processes under various reliability operations are obtained. A relationship between the MNBU processes and a well known class of multivariate NBU distributions is described. Author (GRA)

N83-32470# Wisconsin Univ., Madison. Center for Mathematics Research.
THE IMPORTANCE OF PRACTICE IN THE DEVELOPMENT OF STATISTICS
George E. P. Box Jan. 1983 29 p refs
(Contract DAAG29-80-C-0041)
(AD-A127705; MRC-TSR-2471) Avail: NTIS HC A03/MF A01 CSCL 12/1

The paper shows how application and consideration of the scientific context in which Statistics is used can initiate important advances such as least squares, ratio estimators, correlation, contingency tables, studentization, experimental design, the analysis of variance, randomization, fractional replication, variance component analysis, bioassay, limits for a ratio, quality control, sampling inspection, non-parametric tests, cumulative sum charts, data analysis plotting techniques, and a resolution of the Bayes - frequentist controversy. It appears that advances of this kind are frequently made because practical context reveals a novel formulation which eliminates an unnecessarily limiting framework. GRA

N83-32471# Illinois Univ., Chicago. Dept. of Mathematics.
CHARACTERIZATIONS OF MULTIVARIATE CLASSES OF LIFE DISTRIBUTIONS
Emad El-Neweihi Nov. 1982 8 p refs
(Grant AF-AFOSR-0170-80; AF Proj. 2304)
(AD-A127783; AFOSR-83-0342TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Various multivariate extensions of the univariate classes of increasing failure rate average (IFRA) and new better than used (NBU) distributions are now available. In this paper the author characterizes two of those classes and utilizes the characterizations to derive simple proofs of some properties of the two classes. GRA

N83-32472# Wisconsin Univ., Madison. Center for Mathematics Research.
COMPUTATIONAL IMPLEMENTATION OF THE MULTIVARIATE HALLEY METHOD FOR SOLVING NONLINEAR SYSTEMS OF EQUATIONS
Annie A. M. Cuyt (Antwerp Univ.) and L. B. Rall Feb. 1983 35 p refs Sponsored in part by the Belgian National Fund for Scientific Research

(Contract DAAG29-80-C-0041)
(AD-A127782; MRC-TSR-2481) Avail: NTIS HC A03/MF A01 CSCL 12/1

Halley's method for the solution of systems of equations is an iterative procedure which converges cubically under favorable conditions. The multivariate version requires the solution of two linear systems of equations with the same coefficient matrix, following which the correction vector is computed using component-wise multiplication and division of vectors. This report describes a general-purpose computer program which implements this method. The necessary first and second derivatives are obtained by automatic differentiation, so the user need only supply code defining the functions appearing in the system of equations. The program is written in Pascal-SC, using the new data type HESSIAN to represent dependent and independent variables. Numerical examples are given for two simple systems of equations to illustrate the use of the program and the effectiveness of the method. GRA

N83-32473# Wisconsin Univ., Madison. Center for Mathematics Research.
BALANCED SUBCLASSIFICATION IN OBSERVATIONAL STUDIES USING THE PROPENSITY SCORE: A CASE STUDY
Paul R. Rosenbaum and Donald B. Rubin (Chicago Univ.) Jan. 1983 28 p refs Sponsored in part by National Cancer Inst. and Educational Testing Service
(Contract DAAG29-80-C-0041)
(AD-A127760; MRC-TSR-2468) Avail: NTIS HC A03/MF A01 CSCL 12/1

The propensity score is the conditional probability of assignment to a particular treatment given a vector of observed covariates. Previous theoretical arguments have shown that subclassification on the scalar propensity score will balance all observed covariates. The procedure is illustrated in a large observational study of treatments for coronary artery disease. Five subclasses are constructed that balance 74 covariates. Balanced subclassification is combined with model-based adjustments to provide estimates of treatment effects within subpopulations. Two appendices address theoretical issues: propensity scores from incomplete data, and the effectiveness of subclassification on the propensity score. GRA

N83-32474# Rochester Univ., N. Y. Graduate School of Management.
A DECOMPOSITION OF THE BETA DISTRIBUTION, RELATED ORDER AND ASYMPTOTIC BEHAVIOR
Julian Keilson and Ushio Sumita Aug. 1982 21 p refs Revision
(Grant AF-AFOSR-0043-79; AF Proj. 2304)
(AD-A127815; AFOSR-83-0326TR; WP-8022) Avail: NTIS HC A02/MF A01 CSCL 12/1

Document states that the Beta distribution plays a key role in multivariate analysis and in order statistics. GRA

N83-32475# Delaware Univ., Newark. Dept. of Mathematical Sciences.
ALGORITHMIC METHODS IN PROBABILITY Final Report, 1 Jun. 1981 - 31 May 1982
Marcel F. Neuts Apr. 1983 10 p refs
(Grant AF-AFOSR-3236-77; AF Proj. 2304)
(AD-A128536; AFOSR-83-0417TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report covers the development of algorithmic procedures for the study of stochastic processes and queues. The report submitted for the preceding year listed a large number of papers. Which were at that time submitted or accepted for publication. Most of these papers have now appeared and seem to have a seminal influence on the research on the algorithmic approach to probability and its applications, which is being initiated at more and more centers in Europe and Asia. The research program sponsored by the Air Force of Scientific Research since 1977 has, we believe, contributed significantly to the much needed task of bringing the findings and methodology of the theory of stochastic models closer to its genuine applications in technology. It has done so by the elaboration of mathematical methods that lead to implementable algorithms and to detailed numerical results, whose interpretation yields insight into the stochastic behavior of queues and related stochastic models. GRA

N83-32319# Mathematisch Centrum, Amsterdam (Netherlands).
EMBEDDINGS OF RIESZ SUBSPACES WITH AN APPLICATION TO MATHEMATICAL STATISTICS
E. deJonge From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 21-26 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N83-32476# Texas Univ., Austin. Center for Cybernetic Studies.
HOMOCORES, CORES AND OPERATIONAL INEFFICIENCY IN SUPERADDITIVE N-PERSON GAMES
A. Charnes and B. Golany Feb. 1983 28 p refs
(Contracts N00014-81-C-0236; N00014-82-K-0295)
(AD-A127918; CCS-RR-456) Avail: NTIS HC A03/MF A01 CSCL 12/1

Defects in the core as a solution to n-person superadditive characteristic function games are examined and the process of achieving a reasonable core by changing the value of the grand coalition is studied. A new unique solution concept, the homocore, is proposed based on the homomollifier notion interpreted as the result of implicit bargaining and weighted averages of coalitional worth. Thereby unreasonable cores are excluded but a core-like dominance property on the average is maintained. It also yields a measure of operational efficiency where the game may be interpreted as an economic situation of decreasing marginal productivity. Author (GRA)

N83-32477# Stanford Univ., Calif. Inst. for Mathematical Studies in the Social Sciences.
AGGREGATES, ACTIVITIES AND OVERHEADS
W. M. Gorman Oct. 1982 35 p refs
(Contract N00014-79-C-0685; NR Proj. 047-619)
(AD-A127830; TR-390) Avail: NTIS HC A03/MF A01 CSCL 12/2

This report will take, asking what the operational technology should be like to make such a procedure economic. It will not model the central office itself. It will be assumed throughout that the operational sector is made up of technologically independent factories between which there are no external economies or diseconomies. This will focus on ease of control as the explanation of their being grouped in one organization, and to bring some simple, but powerful, mathematical arguments to bear. GRA

N83-32478# North Carolina Univ., Chapel Hill. School of Business Administration.
ALGORITHMS AND HEURISTICS FOR VARIABLE-YIELD LOT-SIZING
Joseph B. Mazzola, William F. McCoy (Federal Reserve Bank of New York), and Harvey M. Wagner Mar. 1983 28 p refs
(Contract N00014-78-C-0467)
(AD-A127559; TR-24) Avail: NTIS HC A03/MF A01 CSCL 12/2

We consider the multiperiod lot-sizing problem in which the production yield (the proportion of usable goods) is variable according to a known probability distribution. A dynamic programming algorithm for an arbitrary sequence of demand requirements is presented. We review two economic order quantity (EOQ) models for the stationary demand continuous-time problem and derive an EOQ model when the production yield follows a binomial distribution and backlogging of demand is permitted. Heuristics based on the EOQ model are discussed, and a computational evaluation of these heuristics is presented. The heuristics consistently produced

near optimal lot-sizing policies for problems with stationary and cyclic demands. Author (GRA)

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N83-32317# Mathematisch Centrum, Amsterdam (Netherlands).
ORLICZ SPACES: A SURVEY OF CERTAIN ASPECTS
J. J. Grobler From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 1-12 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

N83-32318# Mathematisch Centrum, Amsterdam (Netherlands).
ORTHOMORPHISMS
C. B. Huijsmans From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 13-20 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

N83-32321# Mathematisch Centrum, Amsterdam (Netherlands).
ORTHOMORPHISMS AND THE RADON-NIKODYM THEOREM REVISITED
W. A. J. Luxemburg From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 39-50 Sponsored in part by NSF (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

N83-32322# Mathematisch Centrum, Amsterdam (Netherlands).
ON THE RADON-NIKODYM THEOREM
P. Maritz From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 51-60 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

N83-32323# Mathematisch Centrum, Amsterdam (Netherlands).
DUALITY IN THE THEORY OF BANACH LATTICES
B. dePagter From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 61-67 refs Sponsored by Netherlands Organization for Advancement of Pure Research (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

N83-32324# Mathematisch Centrum, Amsterdam (Netherlands).
SOME RECENT RESULTS ON POSITIVE GROUPS AND SEMIGROUPS
H. H. Schaefer From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 69-79 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

N83-32327# Mathematisch Centrum, Amsterdam (Netherlands).
SOME LATTICE PROPERTIES OF THE SPACE L2
B. Sz.-Nagy From A to Z: Proc. of a Symp. in Honour of A. C. Zaanen 1982 p 101-112 refs (For primary document see N83-32316 20-59)
Avail: NTIS HC A07/MF A01

N83-32331# Groningen Rijksuniversiteit (Netherlands). Mathematisch Inst.
ETALE COVERING OF A MUMFORD CURVE
Marius vanderPut *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33 no. 1 1983 p 29-52 refs (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

N83-32333# California Univ., Los Angeles. Dept. of Mathematics.
THE SMALLEST SUPERHARMONIC MAJORANT AND ITS RELATION TO THE EXISTENCE OF ENTIRE FUNCTIONS OF THE EXPONENTIAL TYPE PLAYING THE ROLE OF MULTIPLIER [LA PLUS PETITE MAJORANTE SURHARMONIQUE ET SON RAPPORT AVEC L'EXISTENCE DES FONCTIONS ENTIERES DE TYPE EXPONENTIEL JOUANT LE ROLE DE MULTIPLICATEURS]
Paul Koosis *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 67-107 refs In FRENCH; ENGLISH summary (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

N83-32338# Limburgs Univ., Diepenbeek (Belgium).
THE GERMS OF DIFFEOMORPHISMS AND OF VECTOR FIELDS IN THE CLASS OF FINITE DIFFERENTIALABILITY
F. Dumortier and R. Roussarie (Dijon Univ.) *In* Grenoble Univ. Ann. of the Fourier Inst., v. 33, no. 1 1983 p 195-267 refs (For primary document see N83-32329 20-59)
Avail: NTIS HC A14/MF A01

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N83-32479 National Physical Lab., Teddington (England). Div. of Quantum Metrology.
SUITABILITY OF A WALL-STABILIZED ARC AS A TRANSFER STANDARD OF SPECTRAL RADIANCE IN THE SPECTRAL RANGE 165 TO 350 nm
P. J. Key, Li Fu-Tian (Changchun Inst. of Optics and Fine Mechanics, People's Republic of China), and D. H. Nettleton Apr. 1983 50 p refs
(NPL-QU-65; ISSN-0309-3050) Copyright. Avail: Issuing Activity

The suitability of a miniaturized wall-stabilized argon arc as a transfer standard of spectral radiance, (relative and absolute) was investigated. Arc calibration: using deuterium lamps to transfer the relative spectral radiance scale; based on synchrotron radiation; and using the absolute spectral radiance of tungsten ribbon lamps calibrated against the visible, black body radiator based emission scale is described. Tests show that the arc is satisfactory for maintaining a scale of relative spectral radiance without recourse to a primary standard. Author (ESA)

N83-32480# Institute of Space and Astronautical Science, Tokyo (Japan).
PROCEEDINGS OF THE SYMPOSIUM ON MECHANICS FOR SPACE FLIGHT
Koichi Oshima, ed. Mar. 1983 279 p refs Symp. held in Tokyo, 18-20 Nov. 1982
(ISAS-SP-1; ISSN-0285-6808) Avail: NTIS HC A13/MF A01

Several areas on mechanics for spaceflight were addressed including computational fluid dynamics, space system analysis, rarefied gas dynamics, thermophysics, and heat pipes. For individual titles, see N83-32481 through N83-32508.

N83-32481# Metropolitan Coll. of Technology, Tokyo (Japan).
SELF-SEMILAR SOLUTIONS OF HYDRODYNAMIC EQUATIONS FOR EXPANDING LAYER WITH BOUNDARY CONDITION SPECIFIED BY DIFFERENTIAL EQUATION **c34**
Hiroyuki Murakami, Moritake Tamba (Inst. of Physical and Chemical Research), and Keishiro Niu (Tokyo Inst. of Technology) *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 1-7 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

A set of self similar solutions of the hydrodynamic differential equations are derived for an expanding layer. The equations consist of continuity, momentum and energy equations. Energy is supplied into the layer constantly in time and homogeneously in space. One end surface of the layer is fixed in the space and the motion of the other end is specified by a partially differential equation. By using a similar variable, the equations are transformed to a set of ordinary differential equations. Forms of these ordinary differential equations and hence the self similar solutions are not unique

according to the choice of similar variables. However, the solutions themselves as functions of time and space are unique.
Author

N83-32482# Tokyo Inst. of Tech. (Japan). Dept. of Energy Sciences.
NUMERICAL SIMULATIONS FOR INTENSE LIGHT-ION BEAM PROPAGATION IN CHANNEL UNDER INFLUENCE OF PLASMA INERTIA **c75**
Sigeo Kawata and Keishiro Niu *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 9-19 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

The intense light ion beam (LIB) propagation through a plasma channel is numerically investigated by using a two dimensional simulation code. Analyses are given for the LIB propagation which couples with the motion of channel plasma. Although the electron back current neutralizes the LIB current under a typical beam and channel plasma condition, the Lorentz force by the electron back current expands the LIB radically. The expansion of the LIB depends strongly on the density of the channel plasma. A strong current of the order of 1 MA is shown to propagate stably in the argon plasma channel. Author

N83-32483# Tokyo Inst. of Tech. (Japan). Dept. of Energy Sciences.
PROPAGATION OF LIGHT ION BEAM MICRO- AND MACRO-STABILITIES OF ROTATING ION LAYER **c75**
Toshio Okada (Tokyo Univ. of Agriculture and Technology), Hiroyuki Murakami (Metropolitan Coll. of Technology), and Keishiro Niu *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 21-26 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

In the investigation of the inertial confinement fusion by a light ion beam (LIB), the most important problem is to propagate the LIB stably through the chamber to the target. The propagation of LIB through a fusion target chamber by the method of plasma channels was investigated. Neverthless in the plasma channel, it is known that such a plasma is unstable in the rarefied background plasma. The method of rotating ion layer as a possible driver for inertial confinement fusion for the purpose of obtaining more stable ion beam for various micro- and macroinstabilities was proposed. The analysis is carried out within the frameworks of the Vlasov and fluid models. Author

N83-32484# Nagoya Univ. (Japan). Dept. of Aeronautical Engineering.
OXYHYDROGEN IGNITION AND FLAME PROPAGATION UNDER CRYOGENIC TEMPERATURES **c25**
A. Koichi Hayashi and T. Fujiwara *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 27-31 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

One dimensional numerical calculations were performed for ignition and flame propagation of oxyhydrogen mixtures under cryogenic conditions. Three aspects on ignition problems were studied; an effect of ambient temperature on the minimum ignition energy, an effect of initial pressure on the minimum ignition energy per mass, and an effect of energy deposit rate on the minimum ignition energy. Author

N83-32485# Kyushu Univ., Fukuoka (Japan). Dept. of Aeronautical Engineering.
GENERATION OF ORTHOGONAL, BOBY-FITTED GRIDS USING POTENTIAL FLOW SOLUTION BY THE PANEL METHOD **c34**
Masanori Hayashi, Akira Sakurai, and Masashi Nagahata *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 33-40 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

A new method of generating an orthogonal, body fitted grid is presented. It uses the equi-potential lines and the streamlines in an imaginary, potential flow around a body calculated by the panel method as the grid lines. The computation is stable and grid density control is easy to achieve. It also is extended to the generation of the so called C-grids. Author

N83-32486# Nihon Univ., Tokyo (Japan). Dept. Aeronautical Engineering.
FREQUENCY EFFECT OF TRANSONIC FLOW OVER AN OSCILLATING AIRFOIL **c02**
Kiyoaki Ono *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 41-50 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

A numerical study is presented for the transonic flow over a two dimensional airfoil oscillating in pitch at the moderately high mean value of the angle of attack. Stressed is the understanding of the frequency effect on the surface pressure characteristics against the instantaneous angle of attack, due to the interaction between the shock wave and the after shock separated boundary layer. An implicit factored finite difference method developed by Beam & Warming is applied to the compressible Navier-Stokes equations. The remarkable improvement of the computation speed is achieved with the program vectorization suitable for CRAY 1-S. The computational results are compared with the experimental data measured at the NASA-Ames 11 by 11 Foot Wind Tunnel.
Author

N83-32487# National Aerospace Lab., Tokyo (Japan).
COMPUTATION OF TWO-DIMENSIONAL, TRANSONIC, CHEMICALLY REACTING NONEQUILIBRIUM FLOW IN A ROCKET NOZZLE **c20**
Kazuhiro Nakahashi *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 51-64 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

A time dependent, semi-implicit scheme is developed for solving the equations governing two dimensional chemically reacting nonequilibrium flow inside rocket nozzles. Subsonic and transonic flowfields of the nozzle entrance and throat region are analyzed using this computational scheme. All equations of motion are solved simultaneously at each grid point by treating the time derivatives implicity, in order to make the scheme stable with respect to the chemical rates. By evaluating spatial derivative terms explicitly, the scheme is made simple and has the advantage that only a relatively small computer storage is required. Results are presented at first for a nonreacting flow inside the JPL nozzle in order to illustrate the proposed scheme's validity by comparing with the experimental data and the result of the Cline's scheme. Then the nozzle flowfield of a hydrogen-oxygen rocket engine is analyzed. A computational result of C-H-O-N system (nitrogen tetroxide and a blend of 50 percent hydrazine and 50 percent unsymmetrical dimethyl hydrazine) is also presented. Author

N83-32488# Ochanomizu Women's Univ., Tokyo (Japan). Dept. of Physics.
LIFT GENERATION DUE TO VORTEX SHEDDING **c02**
Koichi Oshima and Yuko Oshima *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 65-72 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

The stationarily trapped vortex in the vicinity of an airfoil induces lifting force according to the Joukowski theorem, and the induced bound circulation is determined using the Kutta condition and Kelvin's circulation theorem. The moving vortex near an airfoil also produces lift owing to the induced bound circulation. Its strength is determined by the part of the vortex strength which is supposed to be stationary. That is: Suppose that the strength of the free vortex is divided into two parts, the one is flowing with the uniform flow velocity and the other is stationary relative to the airfoil. Then the latter contributes to the lift generation, but the former does not. Author

N83-32489# Hitachi Ltd., Tokyo (Japan). Dept. of Aeronautics.
INTERPLANETARY MISSION DESIGNS BY MULTIPLE EARTH-VENUS-JUPITER SWINGBYS **c12**
Hiroki Yokota and Toru Tanabe *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 65-72 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

A possible usage of a multiple swingby technique which makes use of at most three gravity assist planets (Earth, Venus, and Jupiter) is presented. Various combinations are considered (e.g., a multiple Venus swingby, a multiple Earth-Venus swingby, etc.) and each of the energy exchange mechanisms between a spacecraft and planet(s) is investigated as well as the angular momentum exchange mechanisms. Focusing on attainable orbital elements, the capability of each swingby technique is also investigated. The major purpose of this technique is to reduce the launch velocity increment while maintaining a reasonable flight time. When only one planet is involved, a forward dynamic programming approach is successfully applied to determine the optimal swingby sequence. However, when more than two planets are used, computations become quite time consuming so that a simplified control strategy is proposed. This strategy is built up with several subsequences, in which a forward dynamic programming approach is partially applied. Four specific interplanetary mission designs (M1 through M4) are presented: M1: escaping from the solar system; M2: falling into the Sun; M3: out of the ecliptic mission; and M4: retrograde mission. Author

N83-32490# Hitachi Ltd., Tokyo (Japan).
OPTIMIZATION OF LOW THRUST TRAJECTORIES FOR COLLINEAR LAGRANGE POINT MISSION **c13**
Hiroki Matsuo, Yasunori Matogawa, Tatsuhiro Nozue, and Toshio Shimoda *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 87-102 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

Two kinds of optimization problems on low thrust transfer trajectories are discussed. One is a transfer from Earth parking orbit to Sun-Earth interior libration point I (sub 1). So called J-minimum trajectories are obtained for this case. It is shown that, in spite of some injection error, spacecraft can reach L (sub 1) by optimizing low thrust programs. The other problem pertains to a transfer between collinear Lagrange points, L (sub 1) and L (sub 2) of Sun-Earth system. In this case, two types of low thrust, that is, power constant and thrust constant trajectories are studied. In the former case, J-minimum trajectories are obtained, and, in the latter, fuel optimum trajectories with a single coasting arc were sought including optimal steering programs as a function of total mission time. Computational results show that spacecraft can travel between two points within a mission time that stands comparison with high thrust impulsive transfer. Author

N83-32491# Institute of Space and Astronautical Science, Tokyo (Japan).
ATTITUDE CONTROL EXPERIMENT OF SOUNDING ROCKET S-520-5 **c15**
I. Nakatani *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 103-108 ref (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

S-520-5 is the latest in a series of sounding rocket with attitude control capability which was successfully launched in September, 1982. One of its missions was to take the picture of the Sun in a ultra-violet region and for this purpose, 3-axis attitude control of the rocket was needed. The required attitude accuracy was severe while considerable attitude disturbances exerted by other mission equipment were expected, but good results were obtained. Author

N83-32492# Tohoku Univ., Sendai (Japan). Inst. of High Speed Mechanics.
EXACT DIRECT-SIMULATION-SCHEME FOR THE BOLTZMANN EQUATION/CORRELATION OF MOLECULAR VELOCITIES SUBJECT TO RENEWAL PROCESSES **c72**
Kenichi Nanbu *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 109-122 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

The correlation of velocity between the molecules in a simulation cell is lessened by a renewal process such that new uncorrelated molecules come into the cell and some correlated ones go out of the cell. Moreover, if a portion of the cell boundary is a diffusely reflecting wall, the molecules are subject to another renewal process; each time a molecule is incident on the wall, its velocity is renewed. It is shown that the correlation coefficient between the velocities of the molecules subject to these renewal processes is O (1/N) no matter how large the time may be, where N is the number of the molecules in the cell; by choosing a large N one can make the correlation coefficient as small as one desires. This fact assures that the exact direct simulation method is applicable to the calculation of steady flows, which are obtained as the large time states of unsteady flows. Also, the expressions for correlation functions are obtained. These are necessary for the estimation of the sampling interval used in obtaining the time averaged data of the steady flows. Author

N83-32493# Tohoku Univ., Sendai (Japan). Inst. of High Speed Mechanics.
COUETTE FLOW IN CONTINUUM TO FREE MOLECULAR REGIME **c72**
Kenichi Nanbu *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 123-137 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

By use of the direct simulation method of Nanbu, the Couette flow for wall Mach number 3 is analyzed over the whole range of Knudsen number. Gas is a monatomic one of Maxwell molecules. By comparing the numerical solution obtained from simulation calculations with the approximate six moment solution of Liu and Lees, the accuracy of the latter is examined in detail. As to the flow elocity and shearing stress, the six moment solution shows reasonable agreement with the simulation solution. As to the temperature, density, and heat flux, the error of the six moment solution is not small in all flow regimes except near continuum one. As to the pressure, it is not uniform in the transition regime, differently from the prediction of the six moment solution. Author

N83-32494# National Aerospace Lab., Tokyo (Japan).
RELAXATION OF VELOCITY DISTRIBUTION OF ELECTRONS COOLED (HEATED) BY ROTATIONAL EXCITATION (DE-EXCITATION) OF N SUB 2 **c72**
Katsuhisa Koura *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 143-149 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

The relaxations of the velocity distribution and temperature of electrons cooled or heated by the rotational excitation or deexcitation of nitrogen molecules were studied by the Monte Carlo simulation in the system where the electrons with the initial temperature Te(0) are diluted in the heat bath molecules with the temperature T ($100 < T$, $Te(0) < 3000$ K) and the rotational transition cross section is given by the Gerjuoy-Stein formula. The intial Maxwell electron velocity distribution is perturbed considerably in the cooling process and slightly in the heating process. The electron temperature is higher in the cooling process and lower in the heating process than that of Mentzoni and Row for the local Maxwell distribution. The temperature equilibration time is larger than that of Mentzoni and Row. The initial delta function electron velocity distribution approaches the Maxwell distribution through the rotational excitation and deexcitation only. The Maxwellization is much faster than the temperature equilibration. E.A.K.

N83-32495# Nagoya Univ. (Japan). Dept. of Aeronautical Engineering.
ON THE INTERPOLATION FORMULA BASED UPON THE ASYMPTOTIC SOLUTION TO THE KINETIC MODEL EQUATION **c72**

Takeo Soga *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 151-158 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

When the Knudsen number Kn, the ratio of the mean free path for gas molecules to a reference length of the object, has a finite value, slips of flow velocity, density and temperature affect the macroscopic flow outside of the Knudsen layer. For Kn $<<$ 1 or for Kn $>>$ 1, an asymptotic solution in the power series of Kn or a solution for the free molecular flow is adequate to the problem. The effects of the slips, however, are significant in the transition regime, where the both solutions become invalid; the asymptotic solution may diverge as Kn increases. The solution in this regime are usually obtained numerically. Another approach to the problem is to obtain an interpolation formula valid in this regime, using the asymptotic solutions. The Scherman's formula does not correspond to the accuracy of the asymptotic solution. An interpolation formula which is valid in the whole range of the Knudsen number and of which the accuracy is corresponding to the accuracy of the asymptotic solution is obtained. The cylindrical Couette flow problem to which the numerical solutions are obtained is conered. E.A.K.

N83-32496# Nagoya Univ. (Japan). Dept. of Aeronautical Engineering.
ROTATIONAL TEMPERATURE MEASUREMENTS IN FREE JET EXPANSIONS ON N SUB 2 USING ELECTRON BEAM FLUORESCENCE TECHNIQUE c72
Takeo Soga, Masaya Takanishi, and Michiru Yasuhara *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 159-168 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

The electron beam fluorescence technique is a standard rotational temperature diagnostics in low density, high velocity gas flow. The measurement consists of observing the intensity distribution in the rotational structure of the fluorescence created by a high energy electron beam and relating this to the initial population distribution through an appropriate model of excitation emission process. Application of the Born approximation to the excitation process results in the dipole model used by Muntz. Measurements of the rotational temperature along the center-line of free jets (Fig. 1) from the orifice exit to far downstream of the first Mach disc and examine the Muntz's excitation model and EEI model and thermochemical solution of spherical source flow expansion are shown. E.A.K.

N83-32497# Kyoto Univ. (Japan). Dept. of Aeronautical Engineering.
DENSITY MEASUREMENTS OF A FREE JET BY A LASER DIFFERENTIAL INTERFEROMETER c36
Michio Nishida and Akihiko Nakajima *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 169-177 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

A laser differential interferometer using Wollaston prisms was applied to the density measurements of an argon free jet and the radial density distributions at 10 positions from an orifice were determined by using an Abel inversion under the assumption of an axisymmetric flow. It is concluded that this method is effective to spatially resolve the density distributions of supersonic gas flows. GRA

N83-32498# Kyoto Univ. (Japan). Dept. of Aeronautical Engineering.
TRANSLATION NONEQUILIBRIUM IN A RAPID EXPANSION FLOW FROM A HIGH TEMPERATURE SOURCE c34
Koji Teshima, Tomio Moriya, and Norio Takahashi *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 179-185 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

Terminal parallel temperature of a rapid expansion flow into a vacuum was examined. It is shown that for a high temperature flow, the inclusion of a more realistic intermolecular potential with the repulsive term gives a more accurate prediction of the translational relaxation during the expansion. In a temperture range, 7000 to 10000 K, the measured terminal parallel temperature in an expansion flow of shock heated argon agreed with predicted values. E.A.K.

N83-32499# Hitachi Ltd., Tokyo (Japan). Central Research Lab.
RECENT DEVELOPMENTS IN THE INVESTIGATIONS ON THE GAS-SURFACE INTERACTIONS c76
Tetsuo Fujimoto (Mie Univ.), Shigehiko Yamamoto, and Seizo Kato (Mie Univ.) *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 187-189 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

The study of gas surface interaction by molecular beams which was introduced into the rarefied gas dynamics by Hurlbut who measured the angular distribution of scattered molecules from solid surfaces is discussed. The investigation aimed to obtain the boundary conditions for Boltzmann equation and to determine the accomodation coefficients measuring the fractions of specular and diffuse reflection by which aerodynamic forces and energy transfer can be estimated. Measurements of the energy accomodation coefficient are carried out by thermal cell. The accomodation coefficients of normal and tangential momenta were measured by microbalance. The surface state is analyzed simultaneous by auger electron spectroscopy, secondary ion mass spectroscopy and low electron diffraction. E.A.K.

N83-32500# National Aerospace Lab., Tokyo (Japan).
MONTE CARLO SIMULATION IN MOLECULAR GAS DYNAMICS c72
Katsuhisa Koura *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 191-197 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

In the Monte Carlo simulation in the molecular gas dynamics, the behaviors of molecules are probabilistically simulated based on the Boltzmann equation assumptions, i.e., binary molecular collisions, molecular chaos, and vanishingly short time and small physical space for molecular collisions; the simulated molecules are probabilistically followed using random numbers on a computer through the molecular motions the molecular collisions, and the boundary interactions; the statistical properties of molecules such as the velocity distriution function, the number density, and the temperature are obtained from the simulated molecules. The existing simulation techniques are divided into the test particle method and the direct simulation method. Both the methods are reviewed. E.A.K.

N83-32501# Tokyo Inst. of Tech. (Japan). Research Lab. for Nuclear Reactors.
RAREFACTION PHENOMENA IN GAS ANS ISOTOPE SEPARATION c25
Hisashi Mikami *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 1-7 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

Separation methods which involve rarefaction phenomena as an essential ingredient and present new areas of research on rarefied gases are discussed. Separation processing including centrifugation, separation nozzle and laser method with an emphasis on how they relate to rarefied gas dynamics are reviewed. Rarefied gas mixture flow relating to impurity control and He ash removal in Tokamak fusion reactor is also reviewed as one of examples of new RGD topics concerning gases and isotope separation. E.A.K.

N83-32502# Miyazaki Univ. (Japan). Dept. of Applied Physics.
REMARKS ON THERMAL PROPERTIES OF ROTATING

SUPERFLUID HELIUM IN A GRAVITATIONAL FIELD c76
Kanji Etori *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 211-228 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

The path integral method to the density matrix of a roton Hamiltonian in superfluid Helium, in which the Landau expression for the energy spectrum of thermal excitation is included was applied and with a gravitational potential in a rotating system, a roton Green function to estimate an effective mass of roton and to express the roton number density in the system was obtained. The calculated results of the specific heat of superfluid Helium at several points of very low temperature show some shifts towards greater values than the conventional theoretical ones to be closer to the experimental values in the vicinity of the Lambda point temperature. E.A.K.

N83-32503# Miyazaki Univ. (Japan). Dept. of Applied Physics.
SIMULATION OF BROWNIAN MOTION AFFECTED BY GAUSSIAN FORCE IN GRAVITATIONAL FIELD
Kanji Etori, Shojiro Haraguchi (Hitachi Microcomputer Engineering Co., Ltd.), and Hideki Okushima *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 229-240 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

The velocity correlation and its spectral density of the Brownian motion were calculated by using microcomputer to display the characteristic properties of unsteady behavior of Brownian particles affected by an external force yielded in a constant gravity. It is shown that the Brownian motion is effected by both the ratio of the Brownian particle mass to the mass of a molecule agitating thermally as surrounding media and the value of the standard deviation of Gaussian distribution as the external force disturbing the Brownian motion. E.A.K.

N83-32504# Tsukuba Univ. (Japan). Inst. of Engineering Mechanics.
FLOW FIELD VISUALIZATION OF VAPOR CONDENSATION IN THE ENCLOSURE c34
Yasunori Kobayashi, Mamoru Kaneko, and Tsuyoshi Matsumoto *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 241-245 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

Thermofluid dynamics and phase changes of fluid in enclosures were studied for the practical requirement of developing effective heat transfer systems and devices. The incompleteness in understanding the vaporizing and condensation mechanisms of fluid makes it difficult to formulate a sound modeling of the flow field for obtaining an optimum design of safety equipments for power plants, cooling systems for building, and various heat exchangers for industrial applications. The flow field undergoing vapor condensation onto the flat plate in a simple thermosyphon was investigated. Flow visualization by lasr holographic interferometry is implemented along with supplimentary temperature and pressure measurements of vapor in the vessel. E.A.K.

N83-32505# Seikei Univ., Tokyo (Japan). Dept. of Mechanical Engineering.
STUDIES ON CONDENSATION HEAT TRANSFER IN TWO-PHASE CLOSED THERMOSYPHONS c34
Masao Takuma, Saburo Maezawa, and Akira Tsuchida *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 247-255 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

The effects of shear stress acting on liquid vapor interface at the condenser of two phase closed thermosyphons were studied. An analysis based on Nusselt's theory of filmwise condensation and heat transfer experiments was conducted. The analysis shows that interfacial shear stress caused by rising vapor makes condensate film thicker and condensation heat transfer coefficient and heat transfer rate decreased. Heat transfer rates increase and became large than analytical results. Flow situations inside the thermosyphon are observed using a glass thermosyphon. E.A.K.

N83-32506# Osaka Perfecture (Japan). Dept. of Aeronautical Engineering.
UNSTABLE PHENOMENA IN A TWO-PHASE CLOSED THERMOSYPHON c34
Kanji Negishi *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 257-263 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

A two phase closed thermosyphon falls often into various unsteady state operations. It is a very important problem for the industrial applications. Practical examples of unstable phenomena which occurred in a two phase closed thermosyphon are described. The behaviors of working fluid in this device are observed. The causes of the occurrences of the unstable phenomena are discussed. E.A.K.

N83-32507# Toshiba Research and Development Center, Kawasaki (Japan). Research and Development Center.
THE COOLING UNIT FOR THE CLOSED BOX c34
Toshio Yasunaga and Hisao Koizumi *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 265-271 (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

The use of computers under bad conditions, like, in factories with dusts or bad gases, near coast where damages from sea winds are exist, or outdoors, is discussed. In those places, because of such bad conditions, computers can be used only in clean rooms. A closed box which protects computers or other electric equipment from bad conditions was constructed. To use closed boxes, it is important to cool the equipment in the closed box without air intake. A cooling unit was made to cool the equipment, which a set of heat pipe heat exchangers and a tandem-type scirocco fan are set which transports the heat from the closed box to outer air with heat-pipes. To get high efficiency of heat transfer, heat pipes with fine fins are used. E.A.K.

N83-32508# National Research Inst. for Pollution and Resources, Tokyo (Japan).
HEAT TRANSFER RATE OF LOOPED TYPE HEAT PIPES USING WATER AND NAK AS WORKING FLUID UNDER LIQUID PHASE FLOW c34
Yoshio Tanaka, Tadashi Yamamoto, and Hisao Hattori (Technological Univ. of Nagaoka) *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 273-281 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

The looped type heat pipe which consists of a upward tube and a downward tube, is discussed. Heat is transfered from the heating section in the lower part of the upward tube to the cooling section in the upper part of the downcomer. Driving force for the circulation of the workin fluid is given three modes according to the flow in the rise tube: (1) liquid phase flow; (2) two phase flow; and (3) gas phase flow. The heat transfer rate of the looped type heat pipe employing sodium, potassium, mercury, water, etc., as working luid are calculated. E.A.K.

N83-32509# Stanford Univ., Calif. Physics Lab.
RESEARCH STUDIES ON RADIATIVE COLLISIONAL PROCESSES Final Report, 1 Oct. 1979 - 30 Sep. 1982
S. E. Harris and J. F. Young Nov. 1982 47 p refs
(Contract F49620-80-C-0023; AF Proj. 2301)
(AD-A128533; AFOSR-83-0428TR; SU-GL-3520) Avail: NTIS HC A03/MF A01 CSCL 05/1

This program has supported theoretical and experimental studies in several areas of device physics: the physics and applications of radiative collisional lasers, pair absorption pumped lasers, the use of microwave pumping for the excitation of excimer and other high pressure lasers, and the development of

anti-Stokes spectroscopy for the study of core-excited atomic levels. Author (GRA)

N83-32510# California Univ., Berkeley. Lawrence Berkeley Lab.
SOME EXPERIMENTS IN LOW-TEMPERATURE THERMOMETRY Ph.D. Thesis
William E. Fogle Nov. 1982 190 p refs
(Contract DE-AC03-76SF-00098)
(DE83-004179; LBL-14399) Avail: NTIS HC A09/MF A01

A powdered cerous magnesium nitrate (CMN) temperature scale has been developed in the 0.016 to 3.8 K region which represents an interpolation between the 3He/4He (T62/T58) vapor pressure scale and absolute temperatures in the millikelvin region as determined with a 60Co in hcp Co nuclear orientation thermometer (NOT). Both ac and dc susceptibility thermometers were used in these experiments. The ac susceptibility of a 13 mg CMN-oil slurry was measured with a mutual inductance bridge employing a SQUID null detector while the dc susceptibility of a 3 mg slurry was measured with a SQUID/flux transformer combination. To check the internal consistency of the NOT, gamma-ray intensities were measured both parallel and perpendicular to the Co crystal c-axis. The independent temperatures determined were found to agree to within experimental error. For the CMN thermometers employed in these experiments, the susceptibility was found to obey a Curie-Weiss law with a Weiss constant of delta = 1.05 + - 0.1 mK. The powdered CMN scale in the 0.05 to 1.0 K region was transferred to two germanium resistance thermometers for use in low-temperature specific heat measurements. DOE

N83-32511# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.
PERMANENT MAGNET UNDULATORS
Klaus Halbach Sep. 1982 8 p refs Presented at the Free Electron Laser Conf., Bendor, France, 26 Sep. - 1 Oct. 1982
(Contract DE-AC03-76SF-00098)
(DE83-003590; LBL-14967; CONF-820988-1) Avail: NTIS HC A02/MF A01

Pure Rare Earth Cobalt (REC) undulators and hybrid undulators, using both REC and steel, are described and compared with each other and with conventional and superconducting undulators. The reasons for sometimes preferring permanent magnets over conventional or superconducting magnets are given. DOE

N83-32512# Brookhaven National Lab., Upton, N. Y.
HIGH-FIELD SUPERCONDUCTING WINDOW-FRAME BEAM-TRANSPORT MAGNETS
J. Allinger, A. Carroll, G. Danby, B. DeVito, J. Jackson, W. Leonhardt, A. Prodell, and J. Skarita 1982 13 p refs Presented at the Appl. Superconductivity Conf., Knoxville, Tenn., 30 Nov. 1982
(Contract DE-AC02-76CH-00016)
(DE83-004592; BNL-32268; CONF-821108-9) Avail: NTIS HC A02/MF A01

The window-frame design for high-field superconducting beam-transport magnets was first applied to two, 2-m-long, 4-T modules of an 8 deg bending magnet which has operated for nine years in the primary proton beam line at the Brookhaven National Laboratory Alternating Gradient Synchrotron (AGS). The design of two 1.5-m long, 7.6-cm cold-bore superconducting windowframe magnets, intended for the external proton beam transport system at the AGS incorporated evolutionary changes. These magnets generated a maximum aperture field of 6.8 T with a peak field in the dipole coil of 7.1 T. Measured fields are very accurate and are compared to values calculated using the computer programs LINDA and POISSON. Results of quench-propagation studies demonstrate the excellent thermal stability of the magnets. The magnets quench safely without energy extraction at a maximum current density, J = 130 kA/sq cm in the superconductor, corresponding to J = 57.6 kA/sq cm overall the conductor at B = 6.7 T. DOE

N83-32513# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.
LARGE SCALE SUPERFLUID PRACTICE
S. Caspi, C. Taylor, W. S. Gilbert, W. Hassenzahl, J. Rechen, and R. Warren Jul. 1982 11 p refs Presented at the Ann. Meeting of Heat Transfer and Energy Conversion, Los Angeles, 14 Nov. 1982
(Contract DE-AC03-76SF-00098)
(DE83-001563; LBL-14746; CONF-821106-10) Avail: NTIS HC A02/MF A01

Since 1979 Lawrence Berkeley Laboratory was testing superconducting magnets in He II. The 1 atm pressure, 1.8 K, He II test facility, is an integral part of the LBL Research and Development program on high field superconducting dipole magnets for particle accelerators. Some of the experience gained in this facility and the details of its operation are reported. DOE

N83-32514# Oxford Univ. (England). Cryogenics Lab.
BEHAVIOUR OF A 6 m HIGH THERMOSIPHON
B. A. Hands, C. A. Bailey, and W. J. Tallis Mar. 1983 20 p refs
(Contract JC1/0125)
(OUEL-1460/83) Avail: NTIS HC A02/MF A01

Experimental work carried out to verify aspects of the cryogenic design of the JET cryopumps is described. Work was undertaken to measure flow velocity, dryout point and onset of instabilities in a thermosiphon with a riser 6 m in height, and of three diameters (8 mm, 10.3 mm, 16.6 mm, 16.6 mm internally). Information was also obtained about behavior during cool-down. No serious problems are found in cooling the system either with liquid nitrogen or liquid helium. An homogeneous model and a spectral phases model were used for steady flow predictions. The experimental results fit the separated flow model satisfactorily. Author (ESA)

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution.*

N83-32515* National Aeronautics and Space Administration. Pasadena Office, Calif.
ACOUSTIC SYSTEM FOR MATERIAL TRANSPORT Patent
Martin B. Barmatz (JPL, California Inst. of Tech., Pasadena), Eugene H. Trinh (JPL, California Inst. of Tech., Pasadena), Taylor G. Wang (JPL, California Inst. of Tech., Pasadena), Daniel D. Elleman (JPL, California Inst. of Tech., Pasadena), and Nathan Jacobi, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 19 Jul. 1983 8 p Filed 26 Oct. 1981 Supersedes N82-12889 (20 - 03, p 0407) Sponsored by NASA (NASA-Case-NPO-15453-1; US-Patent-4,393,708; US-Patent-Appl-SN-314929; US-Patent-Class-73-505; US-Patent-Class-60-721;) Avail: US Patent and Trademark Office CSCL 20A

An object within a chamber is acoustically moved by applying wavelengths of different modes to the chamber to move the object between pressure wells formed by the modes. In one system, the object is placed in one end of the chamber while a resonant mode, applied along the length of the chamber, produces a pressure well at the location. The frequency is then switched to a second mode that produces a pressure well at the center of the chamber, to draw the object. When the object reaches the second pressure well and is still traveling towards the second end of the chamber, the acoustic frequency is again shifted to a third mode (which may equal the first model) that has a pressure well in the second end portion of the chamber, to draw the object. A heat source may be located near the second end of the chamber to heat the sample, and after the sample is heated it can be cooled by moving it in a corresponding manner back to the first end of the chamber. The transducers for levitating and moving the object may be all located at the cool first end of the chamber.
Official Gazette of the U.S. Patent and Trademark Office

N83-32516* National Aeronautics and Space Administration. Pasadena Office, Calif.

SYSTEM FOR CONTROLLED ACOUSTIC ROTATION OF OBJECTS Patent

Martin B. Barmatz, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 19 Jul. 1983 7 p Filed 18 Sep. 1981 Supersedes N82-11861 (20 - 02, p 0261) Sponsored by NASA (NASA-Case-NPO-15522-1; US-Patent-4,393,706; US-Patent-Appl-SN-303672; US-Patent-Class-73-505; US-Patent-Class-60-721) Avail: US Patent and Trademark Office CSCL 20A

A system is described for use with acoustically levitated objects, which enables close control of rotation of the object. One system includes transducers that propagate acoustic waves along the three dimensions (X, Y, Z) of a chamber of rectangular cross section. Each transducers generates one wave which is resonant to a corresponding chamber dimension to acoustically levitate an object, and additional higher frequency resonant wavelengths for controlling rotation of the object. The three chamber dimensions and the corresponding three levitation modes (resonant wavelengths) are all different, to avoid degeneracy, or interference, of waves with one another, that could have an effect on object rotation. Only the higher frequencies, with pairs of them having the same wavelength, are utilized to control rotation, so that rotation is controlled independently of levitation and about any arbitrarily chosen axis.

Official Gazette of the U.S. Patent and Trademark Office

N83-32517 National Physical Lab., Teddington (England). Acoustics Unit.

THE EFFECT ON THE MEASUREMENT OF AIRCRAFT NOISE OF REFLECTIONS FROM THE GROUND

R. C. Payne Dec. 1982 37 p refs
(NPL-AC-102; ISSN-0143-7143) Copyright. Avail: Issuing Activity

Data on the acoustic impedance of ground surfaces were used to estimate the influence of ground reflection on levels of aircraft noise measured at 1.2 m. It is shown that the effect on the perceived noise level can be determined by the pressure reflection coefficient at a frequency of 2 kHz, removing the requirement for information on acoustic impedance as a function of frequency. Techniques for determining the reflection coefficient of ground surfaces at a single frequency were evaluated and a procedure for in-situ measurements was developed. The reflection coefficients of a variety of ground surfaces are reported. Author (ESA)

N83-32518*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

INTERIOR NOISE AND VIBRATION MEASUREMENTS ON OPERATIONAL MILITARY HELICOPTERS AND COMPARISONS WITH VARIOUS RIDE QUALITY CRITERIA

Sherman A. Clevenson, Jack D. Leatherwood, and Daniel D. Hollenbaugh (Army Research and Technology Labs., Fort Eustis, Va.) Aug. 1983 82 p refs
(DA Proj. 1L2-62209-AH-76)
(NASA-TM-84664; L-15598; NAS 1.15:84664; AVRADCOM-TR-83-D-21) Avail: NTIS HC A05/MF A01 CSCL 20A

The results of physical measurements of the interior noise and vibration obtained within eight operational military helicopters are presented. The data were extensively analyzed and are presented in the following forms: noise and vibration spectra, overall root-mean-square acceleration levels in three linear axes, peak accelerations at dominant blade passage frequencies, acceleration exceedance data, and overall and "A" weighted sound pressure levels. Peak acceleration levels were compared to the ISO 1-hr reduced comfort and fatigue decreased proficiency boundaries and the NASA discomfort criteria. The "A" weighted noise levels were compared to the NASA annoyance criteria, and the overall noise spectra were compared to MIL-STD-1294 ("Acoustical Noise Limits in Helicopters"). Specific vibration components at blade passage frequencies for several aircraft exceeded both the ISO reduced comfort boundary and the NASA passenger discomfort criteria. The "A" weighted noise levels, corrected for SPH-4 helmet attenuation characteristics, exceeded the NASA annoyance threshold for several aircraft. Author

N83-32519# Wisconsin Univ., Madison. Center for Mathematics Research.

ITERATIVE NOISE ELIMINATION PRELIMINARY REPORT

K. T. Smith Jan. 1983 51 p ref Sponsored in part by Tektronix Co.
(Contract DAAG29-80-C-0041; Grant NSF MCS-81-01586)
(AD-A127756; MRC-TSR-2464) Avail: NTIS HC A04/MF A01 CSCL 20/1

A common feature of the empirical data in applied mathematics is a low signal to noise ratio. Defined loosely as the ratio of the magnitude of essential signals to the magnitude of the worst noise, it often runs between 1/10 and 1/15, as was the case in the early work on computer tomography with digitized medical X-ray films which was the origin of this project. In such situations, straight-forward linear smoothing procedures tend to broaden the noise peaks without reducing the magnitude sufficiently. A common redeeming feature of the noise is that the largest peaks are quite sparse, lesser peaks are more frequent but still sparse, etc. This suggests a stepwise smoothing in which only the worst peaks are removed during the early steps when there is no very good way to remove them. The purpose of the present report is to describe the procedure and to show the results of a series of tests with data from a computed tomography X-ray scan of a defective battery. GRA

N83-32520# Naval Research Lab., Washington, D. C. Large Aperture Acoustic Branch.

THREE-DIMENSIONAL PARABOLIC-EQUATION-BASED ESTIMATION OF THE OCEAN ACOUSTIC FIELD Interim Report

John S. Perkins, Ralph N. Baer, Laura F. Roche (Planning Systems Inc.), and L. Bruce Palmer (Planning Systems Inc.) 31 Mar. 1983 47 p refs
(RR0110843)
(AD-A128507; NRL-8685) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report describes a three dimensional parabolic-equation-based model for deterministic acoustic propagation in a deep-ocean environment. It constitutes one of the outputs of a research program in spatial properties of the low-frequency acoustic field initiated in 1974 to describe the effects of internal ocean inhomogeneities on the performance of large undersea acoustic antennas. In that program these inhomogeneities were divided into large-scale internal-wave-type features thought to be more evenly distributed throughout the ocean. This model deals with the former case and enables the complete calculation of the three dimensional acoustic field, that is, the azimuthal as well as the vertical distribution of energy. It can handle both a three dimensionally varying sound-speed field and a triangularly faceted bathymetry. To facilitate calculations with moderate horizontal gradients and little or no crossangle scattering generated by the bottom, a modified version that in effect enables the propagation of a coherent phase-tracked fan is also described and developed. GRA

N83-32521# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

INFLUENCE OF SCANNING VARIABLES ON ULTRASONIC RESPONSE

K. V. Cook, P. J. Latimer, and R. W. McClung Dec. 1982 17 p
(Contract W-7405-eng-26)
(DE83-003754; NUREG/CR-2967; ORNL/TM-8519) Avail: NTIS HC A02/MF A01

The effects of scanning variables such as scanning speed, contact pressure, and couplant viscosity and their impact on ultrasonic amplitude response were considered. In addition, the surface adherence with repeated scanning was investigated for the commonly used couplants. The results of this investigation were used to consider the relative merits of the various couplants for use in mechanized scanning. Of the couplants tested, water,

glycerin, or a mixture of the two gave the best results for automated scanning applications. DOE

N83-31656# Tokyo Inst. of Tech. (Japan).
DEVELOPMENT OF AN ACOUSTIC LEVITATION DEVICE WITH A MIRROR FURNACE
Y. Ikegami (IHI, Tokyo), E. Mori, and M. Saito (NASDA, Tokyo) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 121-125 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N83-32522*# Midwest Research Inst., Kansas City, Mo.
CONTAINERLESS HIGH TEMPERATURE PROPERTY MEASUREMENTS BY ATOMIC FLUORESCENCE Annual Technical Report
Jun. 1983 35 p refs
(Contract NAS8-34383)
(NASA-CR-170835; NAS 1.26:170835) Avail: NTIS HC A03/MF A01 CSCL 20H

The use of laser induced fluorescence (LIF) techniques for containerless study of high temperature processes and material properties is studied. Gas jet and electromagnetic levitation and electromagnetic and laser heating techniques are used with LIF in Earth-based containerless high temperature experiments. The work to date includes development of an apparatus and its use in studies of chemical reactions on Al2O3, molybdenum, and tungsten specimens, novel methods for noncontact specimen temperature measurement, and levitation jet properties. Brief summaries of these studies are given. The apparatus is described and detailed results for the current reporting period are presented. Author

N83-32523# Mission Research Corp., Albuquerque, N. Mex.
EXTRACTION AND PROPAGATION OF AN INTENSE ROTATING ELECTRON BEAM
R. J. Adler, G. F. Kiuttu, T. P. Hughes, and B. Sabol (Air Force Weapons Lab., Kirtland AFB, New Mexico) Oct. 1982 35 p refs Prepared for Sandia National Lab.
(AD-A127018; AMRC-R-422) Avail: NTIS HC A03/MF A01 CSCL 20/7

A hollow electron beam produced in a strong axial magnetic field has been extracted into a neutral gas cell where the magnetic field is zero. Due to radial magnetic field in the transition region, the beam rotates and maintains its hollow profile. Equilibrium is provided by the vz x b0 inward force and centrifugal outward force. We have studied both extraction and propagation phenomena in this configuration. Measurements include beam and net currents, beam generated axial magnetic fields, beam rotation and emittance, and light produced. A filamentation instability has been observed outside the magnetic field in this configuration. Beam equilibrium results are also presented and are compared with both experiment and numerical simulation. GRA

N83-32524# Texas Univ., Austin. Dept. of Chemistry.
DEVELOPMENT OF PRACTICAL MO TECHNIQUES FOR PREDICTION OF THE PROPERTIES AND BEHAVIOR OF MATERIALS Final Scientific Report, 1 Nov. 1979 - 31 Oct. 1982
Michael J. S. Dewar Oct. 1982 42 p
(Grant AF-AFOSR-0008-79; AF Proj. 2303)
(AD-A127029; AFOSR-83-0234TR) Avail: NTIS HC A03/MF A01 CSCL 07/3

A new parametric SCF MO method (AM1 has been developed which seems to have overcome the remaining deficiencies of MINDO/3 and MNDO, in particular their failure to reproduce hydrogen bonds, overrestimation of nonbonded repulsions, and poor results for compounds containing nitrogen and oxygen, in particular those containing the NO2 group. MNDO parameters have been devised for bromine and iodine. d-AOs have been introduced into MNDO and the resulting treatment (MNDOD) parameters for P and S. This work has been suspended to take advantage of AM1. Our programs have been rewritten, improved, and combined into a single package (MOPAC) which we will be sending to QCPE. The new programs run nearly three times faster. GRA

N83-32525# Illinois Univ., Urbana. Fusion Technology Lab.
RESEARCH ON A NEW TYPE OF NEGATIVE HYDROGEN ION SOURCE Annual Report, 15 Jul. 1981 - 14 Jul. 1982
R. J. Turnbull 14 Sep. 1982 156 p refs
(Grant AF-AFOSR-0160-81; AF Proj. 2301)
(AD-A127947; AFOSR-83-0345TR) Avail: NTIS HC A08/MF A01 CSCL 07/2

Two techniques for production of vibrationally excited hydrogen for negative ion sources were investigated. The first technique involved laser heating of solid hydrogen allowing the resulting gas to expand into vacuum. The hydrogen was heated and the experimental data and a theory which was developed can be used to optimize this system to produce the desired parameters. The second technique involved heating hydrogen gas at a nozzle outlet and allowing it to expand into vacuum. A system to accomplish this has been built and tested. The gas was pulsed with a fast valve and the heating discharge was initiated by the gas flow. Finally, a discharge for converting the vibrationally excited hydrogen to negative ions was designed. GRA

N83-32526# Naval Research Lab., Washington, D. C. Plasma Theory Branch.
DRAG INSTABILITY IN THE MODIFIED BETATRON Interim Report
P. Sprangle and C. A. Kapetanakos 16 May 1983 32 p refs (RR011094E)
(AD-A128242; NRL-MR-4950) Avail: NTIS HC A03/MF A01 CSCL 20/7

The instability discussed in this report is a special case of the resistive wall instability. It occurs when the beam current, that propagates inside a resistive vacuum chamber along an external toroidal magnetic field, exceeds a critical value. The drag instability is characterized by uniform density in the direction of propagation, i.e., the toroidal wave number is zero. The authors have studied the drag instability over a wide range of parameters, including the limit delta greater than (b-a) where delta is the skin depth and (b-a) is the thickness of the conducting wall. This limit is relevant to the proof-of-principle experiment on the modified betratron accelerator presently under design at the Naval Research Laboratory. Author (GRA)

N83-32527# National Bureau of Standards, Washington, D.C. Surface Science Div.
ELECTRON AND PHOTON STIMULATED DESORPTION: BENEFITS AND PITFALLS Interim Report
Theodore E. Madey, D. L. Doering, E. Bertel (Maryland Univ.), and R. Stockbauer 1 May 1983 37 p refs Submitted for publication Sponsored in part by DOE
(Contract N00014-83-F-0002)
(AD-A128239; TR-33) Avail: NTIS HC A03/MF A01 CSCL 07/4

Electron beam irradiation of solids often results in damage-producing events along with information-producing events. In the present paper we explore mechanisms of beam damage in solids, as well as examples of the benefits of electron (and photon) stimulated processes to study molecules at surfaces. Information about the geometrical structure of adsorbed species can be obtained from measurements of the angular distribution of ions released by electron of photon stimulated desorption. The directions of ion emission are directly related to the orientations of the surface bonds which are ruptured by the excitation. The method if Electron Stimulated Desorption Ion Angular Distributions (ESDIAD) has proven particularly useful in characterizing local molecular structure at surfaces in the absence of long range order; recent measurements of bonding configurations stabilized by impurities or by lateral interactions are discussed. Photon stimulated desorption (PSD) studies using synchrotron radiation are providing new insights into fundamental electronic excitation processes at surfaces. Mecha-

nisms for the excitation and desorption of ions are examined (valence, shallow core level and deep core level excitations), and examples include ion desorption from adsorbed monolayers, as well as ion formation and desorption processes in condensed molecular films. GRA

N83-32528# University of Southern California, Los Angeles.
UNIMOLECULAR REACTIONS OF NITRITES AND NITRATES Annual Report, 1 Apr. - 31 Mar. 1982
Curt Wittig and Hanna Reisler 1 Apr. 1983 28 p refs
(Contract N00014-80-C-0539)
(AD-A127825) Avail: NTIS HC A03/MF A01 CSCL 20/8

Photodissociation of CH3ONO, C2H5ONO, and C3H7ONO have been studied using multiphoton ionization (MPI) to detect the NO fragment. Each of these molecules was dissociated by one photon (382-383 nm) and the fragment NO(X 2 Pi) was excited and ionized in a subsequent (2+1) photon process. All events occurred within the same laser pulse duration (- 7 ns), thus ensuring collision-free conditions. The MPI spectrum NO was analyzed for rotational state distributions. When compared to a room temperature spectrum of NO at 300 K, the extent of NO rotational excitation observed in CH3ONO was very large, Erot>1/ 2100 cm) and the distribution of NO was found to be non-thermal. C2H5ONO and C3H7ONO on the other hand, produced NO fragments which displayed a Boltzmann behavior and could be characterized by Trot equals 350 K and 250 K respectively.
Author (GRA)

N83-32529*# Rochester Univ., N. Y. Dept. of Chemistry.
INCLUSION OF DISCRETE-TO-CONTINUUM COUPLING IN MULTIPHOTON EXCITATION AND DISSOCIATION CALCULATIONS
I. Harold Zimmerman (Clarkson Coll.), Stephen D. Druger (Clarkson Coll.), and Thomas F. George 20 Jun. 1982 8 p refs Submitted for publication
(Grants NsG-2198; AF-AFOSR-0046-82; NSF CHE-80-22874; AF Proj. 2303)
(NASA-CR-172836; NAS 1.26:172836; AD-A127813; AFOSR-83-0359TR) Avail: NTIS HC A02/MF A01 CSCL 20H

A nonperturbative approach to multiphoton excitation and dissociation of molecules is presented in which coupling to the continuum is treated explicity. Transitions among continuum levels are not modeled directly, but something of their effect is represented by assuming that the continuum population density is so low as to be effectively zerc at all times. Two trial applications are briefly discussed. GRA

N83-32530# California Univ., Livermore. Lawrence Livermore Lab.
ATOMIC-VAPOR-LASER ISOTOPE SEPARATION
James I. Davis Oct. 1982 7 p Presented at the IEEE Nucl. Sci. Symp., Washington, D.C., 20 Oct. 1982
(Contract W-7405-eng-48)
(DE83-003253; UCRL-88040; CONF-821011-16) Avail: NTIS HC A02/MF A01

A brief history of the scientific considerations leading to the development of laser isotope separation (LIS) process is given. The close relationship of LIS to the broader field of laser-induced chemical processes is evaluated in terms of physical criteria to achieve an efficient production process. Atomic-vapor LIS processes under development at Livermore are reviewed. DOE

N83-32531# Pacific Northwest Lab., Richland, Wash.
BETA AND LOW-ENERGY PHOTON IRRADIATION OF SEVERAL COMMERCIAL PHOSPHORS
J. J. Fix, K. L. Holbrook, and K. L. Soldat Feb. 1983 10 p refs Presented at Intern. Beta Dosimetry Symp., Washington, D.C., 15 Feb. 1983
(Contract DE-AC06-76RL-01830)
(DE83-006606; PNL-SA-10691; CONF-830204-2) Avail: NTIS HC A02/MF A01

Several commercially available thermoluminescent phosphors were evaluated with respect to their observed response to selected beta sources and K-fluorescent X rays. Phosphor responses were determined for in-air and on-phantom irradiations. Similar irradiations were done using a 137Cs source. Phosphor glow curves were recorded using a Harshaw Model 2080 TL Picoprocessor. DOE

N83-32532# Pacific Northwest Lab., Richland, Wash.
RESPONSE OF A MULTI-ELEMENT DOSIMETER TO CALIBRATED BETA SOURCES WITH E SUB max FROM 0.23 TO 3.5 MeV
G. W. R. Endres, R. I. Scherpelz, and P. L. Robertson Jun. 1982 10 p ref Presented at the Health Phys. Soc. Ann. Meeting, Las Vegas, Nev., 27 Jun. - 1 Jul. 1982
(Contract DE-AC06-76RL-01830)
(DE83-002013; PNL-SA-10154; CONF-820655-11) Avail: NTIS HC A02/MF A01

The responses of several different dosimeter absorber systems were studied to determine their usefulness in beta radiation fields. Exposures to several different beta emitters were conducted at the PNL Calibrations Laboratory. The sources used are (147)pm, (85)kr, U(nat), (90)Sr-(90)Y, and (106)Rh. The maximum energy of these beta emitters varies from 0.23 to 3.5 MeV. The beta sources are calibrated for absorbed dose to tissue at a depth of 0.007 cm. Measurements of response for 4, 5, and 7 element versions of the dosimeter were made. All data reported were obtained from sets of three TLDs exposed under each absorber and for each of the radiation sources. DOE

N83-32533# Sandia Labs., Albuquerque, N. Mex. Simulation Technology Research Div.
TRANSITION RADIATION: A POSSIBLE DIAGNOSTIC TOOL FOR RELATIVISTIC ELECTRONS AT SANDIA
Thomas W. L. Sanford, Wendland Beezhol, and James R. Lee Dec. 1982 26 p refs
(Contract DE-AC04-76DP-00789)
(DE83-006844; SAND-82-1820) Avail: NTIS HC A03/MF A01

The properties of transition radiation are briefly discussed in order to explore the possibilities of using this type of radiation as an intense source of X rays or as a diagnostic tool on high-energy electron accelerators. It is concluded that owing to the low intensity of the radiation per transition surface, transition radiation offers little possibility as an intense source of X rays. However, because the intensity grows linearly with gamma transition is useful as a diagnostic tool in association with high-energy accelerators. DOE

N83-32534# Los Alamos Scientific Lab., N. Mex.
NONTHERMAL ULTRASOFT X-RAY SPECTRA ON ZT-40M
R. G. Watt, K. S. Thomas, and E. M. Little Dec. 1982 13 p refs
(Contract W-7405-eng-36)
(DE83-007123; LA-9588-MS) Avail: NTIS HC A02/MF A01

Thin-foil differential transmission measurements of ultrasoft X rays have been performed on the ZT-40M device at Los Alamos National Laboratory. Time histories of the ratio of intensities seen through 1-mil and 2-mil Be foils are in reasonable (+-50eV) agreement with Thomson scattering measurements up to approximately 3 ms into the discharge, but examination (at any particular time) of the intensity-vs-foil thickness for all four available foils shows evidence of pronounced nonthermal characteristics. In an effort to explain the observation, the detailed theory of emission for a runaway electron distribution will be examined, and predictions based on this theory will be shown capable of reproducing the observed behavior. Comments on the ability of oxygen impurity radiation in the 600- to 800-eV range to also fit the observation will be made. DOE

N83-32535# Oak Ridge National Lab., Tenn.
ATOMIC PHYSICS PROCESSES IN RADIAL TRANSPORT CALCULATIONS
John T. Hogan Feb. 1983 40 p refs Presented at the NATO Advan. Study Inst. on Atomic and Molecular Processes in Controlled Fusion Res., Palermo, Italy, Jul. 1982
(Contract W-7405-eng-26)
(DE83-007172; ORNL/TM-8547) Avail: NTIS HC A03/MF A01

These lectures were intended as preparation for detailed discussions of the role of atomic and molecular physics in confinement research at the 1982 NATO Advanced Study Institute. They begin with a description of the major approaches to magnetic confinement: tandem (ambipolar) mirrors with their associated auxiliary barriers, Tokamaks, and stellarators. The leading alternatives, the ELMO Bumpy Torus and the reversed field pinch, are also treated. The evolution equations for particle, energy, and (where relevant) field diffusion are presented and discussed. This is the context for atomic and molecular processes relevant to confinement. DOE

N83-32536# California Univ., Livermore. Lawrence Livermore Lab.
INFLUENCE OF CENTERING FORCES ON IFR HOSE INSTABILITY
H. L. Buchanan 6 Dec. 1982 12 p refs
(Contract W-7405-eng-48)
(DE83-006719; UCID-19675) Avail: NTIS HC A02/MF A01

The appropriate centering force terms are added to the ion-focused regime hose equations and their effect on hose development is calculated. It is found that while hose at very high frequencies is stabilized, the overall suppression is only moderate and other stabilization processes need to be explored. DOE

N83-32537# Argonne National Lab., Ill. Applied Physics Div.
FAST-NEUTRON TOTAL AND SCATTERING CROSS SECTIONS OF NIOBIUM
A. B. Smith, P. T. Guenther, and J. F. Whalen Jul. 1982 24 p refs
(Contract W-31-109-eng-38)
(DE83-002285; ANL/NDM-70) Avail: NTIS HC A02/MF A01

Neutron total cross sections of niobium were measured from 0.7 to 4.5 MeV at intervals of < or = keV with broad resolution. Differential-elastic-scattering cross sections were measured from 1.5 to 4.0 MeV at intervals of 0.1 to 0.2 MeV and at 10 to 20 scattering angles distributed between 20 and 160 degrees. Inelastically-scattered neutrons, corresponding to the excitation of levels at: 788 + or - 23, 982 + or - 17, 1088 + or - d27, 1335 + or - 35, 1504 + or 30, 1697 + or - 19, 1971 + or - 22, 2176 + or - 28, 2456 + or - -(?), and 2581 + or - -(?) keV, were observed. An optical-statistical model, giving a good description of the observables, was deduced from the measured differential-elastic-scattering cross sections. The experimental-results were compared with the respective evaluated quantities given in ENDF/B-V. DOE

N83-32538# Rockefeller Univ., New York.
DETERMINATION OF THE ANGULAR AND ENERGY DEPENDENCE OF HARD CONSTITUENT SCATTERING FROM PI-O PAIR EVENTS AT THE CERN INTERSECTING STORAGE RINGS
A. L. S. Angelis, H. J. Besch, B. J. Blumenfeld, L. Camilleri, T. J. Chapin, R. L. Cool, C. delPapa, L. DiLella, Z. Dimcovski, R. J. Hollebeek et al 23 Aug. 1982 28 p refs Presented at the 21st Intern. Conf. on High-Energy Phys., Paris 26-31 Jul. 1982 Prepared in cooperation with Oxford Univ. (UK), and Columbia Univ., N.Y. and CERN, Geneva
(Contract DE-AC02-81ER-40033)
(DE83-002451; DOE/ER-40033/32; CERN-EP-82-133; CONF-820718-17) Avail: NTIS HC A03/MF A01

Data on proton-proton collision, obtained at the CERN Intersecting Storage Rings was presented, in which two roughly back to back pi(0)'s high transverse momentum (p/sub T/) were produced. The angular distribution of the dipion axis relative to the collision axis is found to be independent of both the effective mass m of the dipion system and the centre-of-mass energy of the proton-proton collision. The cross-section d sigma/dm at the two values of roots satisfy a scaling law of the form d sigma/dm = G(x)/m/sup n/, where x = m(pi(0),pi(0))/roots and n = 6.5 +- 0.5. The leading pi(0) carries most of the momentum of the scattered parton. Given this fact, the axis of the dipion system follows closely the direction of the scattered constituents, and the angular dependence of the hard scattering subprocess was determined. Our data was compared with the lowest order Quantum Chromodynamics (QCD) predictions using structure functions as determined in deep inelastic scattering and fragmentation functions from electron-positron annihilation. DOE

N83-32539# Brookhaven National Lab., Upton, N. Y.
CHARGE CORRELATIONS IN DEEP INELASTIC PROTON-PROTON INTERACTIONS AT THE CERN ISR: THE AXIAL FIELD SPECTROMETER COLLABORATION
T. Akesson, M. G. Albrow, S. Almehed, R. Batley, O. Benary, H. Boggild, O. Botner, H. Brody, V. Burkert, A. DiCiaccio et al 1982 18 p refs Presented at the 21st Intern. Conf. on High Energy Phys., Paris, 29 Jul. 1982 Prepared in cooperation with CERN, Geneva; Niels Bohr Inst., Copenhagen; Lund Univ., Sweden; Penn. Univ, Philadelphia; Science Research Council, Chilton, UK; and Tel Aviv Univ.
(Contract DE-AC02-76CH-00016)
(DE83-002324; BNL-31953; CONF-820718-15) Avail: NTIS HC A02/MF A01

The production of charged particles in pp collisions at radical s = 63 GeV with an identified high p/sub T/ trigger particle emitted in the central region is studied. The measurements were performed at the CERN ISR using the Axial Field Spectrometer. The dependence of the ratio between positively and negatively charged particles on the identity, the transverse momentum and the rapidity of the trigger particle is investigated both in the system recoiling from the trigger particle and at small angles with respect to the trigger particle. The recoil system opposite to a positively charged trigger particle is nearly neutral, but shows a positive excess for negatively charged trigger particles. On the trigger side a charge compensating effect is seen, strongest for negatively charged trigger particles. DOE

N83-32540# Los Alamos Scientific Lab., N. Mex.
LASER-INDUCED FLUORESCENCE DETECTION OF LARGE ORGANIC MOLECULES
G. P. Quigley and W. C. Danen 1982 6 p refs Presented at Topical Meeting on Opt. Techniques for Remote Probing of the Atmosphere, Incline Village, Nev., 10 Jan. 1983
(Contract W-7405-eng-36)
(DE83-000353; LA-UR-82-2578; CONF-830109-1) Avail: NTIS HC A02/MF A01

The UV-visible spectroscopic characteristics of these molecules are broad and featureless. This paper discusses techniques to detect them in mixtures where obscuration by other molecules is a problem. DOE

N83-32541# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.
RESEARCH NEEDS OF THE NEW ACCELERATOR TECHNOLOGIES
Andrew M. Sessler Aug. 1982 21 p refs Presented at the Seminar on New Trends in Particle Acceleration Tech., Capri, Italy, 1-3 Jun. 1982
(Contract DE-AC03-76SF-00098)
(DE83-000518; LBL-14819; CONF-8206125-1) Avail: NTIS HC A02/MF A01

A review is given of some of the new accelerator technologies with a special eye to the requirements which they generate for research and development. Some remarks are made concerning the organizational needs of accelerator research. DOE

N83-32542# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.
COLLECTIVE EFFECT ACCELERATORS AND THE CHALLENGE OF ATTAINING ULTRA-HIGH ENERGIES
Andrew M. Sessler Sep. 1982 12 p refs Presented at the European Committee of Future Accelerators: The Challenge of Ultra-High Energies Conf., Oxford, 27-30 Sep. 1982
(Contract DE-AC03-76SF-00098)
(DE83-002566; LBL-15019; CONF-820980-1) Avail: NTIS HC A02/MF A01

Collective effect acceleration concepts are very briefly reviewed. Particular attention is given to their relevance to the acceleration of particles to ultra-high energies. L.F.M.

N83-32543# Brookhaven National Lab., Upton, N. Y. Dept. of Chemistry.
REPORT ON SOLAR-NEUTRINO EXPERIMENTS
Raymond Davis, Jr. 1982 17 p refs Presented at the Workshop on Proton Decay Expts., Argonne, Ill., 7 Jun. 1982
(Contract DE-AC02-76CH-00016)
(DE83-001306; BNL-31974; CONF-8206123-1) Avail: NTIS HC A02/MF A01

The results of the chlorine detector are summarized, and an account made of the plans to build a gallium solar neutrino experiment. In addition to discussing the experimental side of the solar neutrino problem the experiences during the last 15 years in working in the Homestake Gold Mine are related. A number of independent groups have asked to use the facilities and, because of the cooperative and helpful attitude of the Mine management, these experimentalists were easily accommodated. A brief account of these experiences is useful for the main business of this workshop, building large particle detectors for observing nucleon decay, and the related question of the need for a national underground physics facility. DOE

N83-32544# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
THIRD-HARMONIC GENERATION FOR PHOTOIONIZATION STUDIES
R. N. Compton and J. C. Miller 1982 8 p refs Presented at the US/Japan Seminar on Electron-Molecule Collision and Photoionization Processes, Pasadena, Calif., 26-29 Oct. 1982
(Contract W-7405-eng-26)
(DE83-001960; CONF-821073-1) Avail: NTIS HC A02/MF A01

Resonantly enhanced multiphoton ionization (MPI) of alkali atoms, rare gases, and small molecules using tightly focused dye laser beams (power densities of 10 to the 9th power to 10 to the 11th power w/square cm) were studied. In the case of alkali atoms, some ionization signals appear as a result of gas density effects (dimers or quasi-collisions). These were termed hybrid-resonances. By contrast, in the case of the rare gases, certain resonance ionization signals disappear with increasing gas density. The disappearance of the ionization signals in the rare gases is due the interference of excitation of the third harmonic and fundamental laser beam. At low pressure (.0000001 to .00001 torr) mass spectra, kinetic energy released in ionic fragmentation, and photoelectron kinetic energy spectra using time of flight mass analysis and a 160 degree spherical sector electrostatic energy analyzer were studied. DOE

N83-32545# Los Alamos Scientific Lab., N. Mex.
HIGH-BRIGHTNESS NEGATIVE-HYDROGEN LINEAR ACCELERATOR
E. Alan Wadlinger, John A. Farrell, and Harald O. Dogliani 1982 17 p refs Presented at the 7th Conf. on the Appl. of Accelerators in Res. and Ind., Denton, Tex., 7-10 Nov. 1982
(Contract W-7405-eng-36)
(DE83-003565; LA-UR-82-3267; CONF-821123-28) Avail: NTIS HC A02/MF A01

A linear accelerator was designed to accelerate negative hydrogen ions to 50 MeV with an instantaneous output current of 100 mA and a normalized rms emittance in both transverse planes of 0.02 pi cm mrad. The design and results obtained to date with a 2 MeV prototype are presented. DOE

N83-32546# California Univ., Berkeley. Lawrence Berkeley Lab.
MODE SPECIFICITY IN UNIMOLECULAR REACTION DYNAMICS Ph.D. Thesis
Boyd Alan Waite Jul. 1982 140 p refs
(Contract DE-AC03-76SF-00098)
(DE83-0001932; LBL-14719) Avail: NTIS HC A07/MF A01

Theoretical studies on mode specificity in unimolecular reaction dynamics are presented, based on essentially exact quantum mechanical methods, a semi-classical multichannel branching model, and classical trajectory methods. The principal aim is to discover the relevant factors governing whether a unimolecular system exhibits mode specificity in its individual state rate constants, i.e., whether quasi-degenerate metastable state decay with significantly different rates. Model studies of two nonlinearly coupled oscillators (one of which can dissociate) demonstrate the effects of various features of potential energy surfaces on the character of the rates (e.g., degeneracy of modes, reaction path curvature, frequency modulation, etc.). These results and those obtained for the Henon-Helies potential energy surface indicate an apparent absence of correlation between the quasi-periodic/ergodic motion of classical mechanics and the mode specific/statistical behavior of the unimolecular rate constants. DOE

N83-32547# Fermi National Accelerator Lab., Batavia, Ill.
PRODUCTION OF HIGH-TRANSVERSE-ENERGY EVENTS IN p-NUCLEUS COLLISIONS AT 400 GeV/c
B. Brown, P. Devenski, S. Gronemeyer, H. Haggerty, E. Malamud, P. Rapp, R. Abrams (Illinos Univ., Chicago Circle), H. Goldberg (Illinois Univ., Chicago Circle), C. Halliwell (Illinois Univ., Chicago Circle), F. Lopez (Illinois Univ., Chicago Circle) et al Oct. 1982 8 p refs
(Contract DE-AC02-76CH-03000)
(DE83-002099; FERMILAB-Pub-82-74-Exp) Avail: NTIS HC A02/MF A01

High transverse energy events produced in proton-nucleus collisions at 400 GeV/c were studied using the Fermilab Multiparticle Spectrometer. The cross sections for such innteractions increase more rapidly than the atomic mass number for both small and large acceptance data. The nuclear events are less planar than the corresponding high transverse energy pp events. DOE

N83-32548# Fermi National Accelerator Lab., Batavia, Ill.
MEASUREMENT OF STRANGE QUARK SUPPRESSION IN HADRONIC VACUUM
P. K. Malhotra and R. Orava Nov. 1982 17 p refs
(Contract DE-AC02-76CH-03000)
(DE83-000918; FERMILAB-Pub-82-79) Avail: NTIS HC A02/MF A01

We have analyzed experimental data on (1)e+e- annihilation to hadrons, (2) leptoproduction, (3) hadron-hadron interactions, and (4) heavy particle decays to determine SU(3) symmetry violation, i.e., the suppression factor (lambda) for strange quark-antiquark pairs relative to u anti u and d anti d pairs in the hadronic vacuum. Inclusive particles ratios, i.e., K/pi ratios at large x and ratios between the inclusive production rates of relevant resonances, yield similar values of lambda, the weighted mean being less than lambda greater than = 0.29 + or - 0.02. No significant energy dependence of lambda is observed. We also find that the average net electric charge measurements for lepton produced quark jets are consistent with the above value of lambda. DOE

N83-32549# Fermi National Accelerator Lab., Batavia, Ill.
PSI PRIME PHOTOPRODUCTION AT A MEAN ENERGY OF 150 GeV
M. Binkley, J. Butler, J. Cumalat, I. Gaines, M. Gormley, D. Harding, R. L. Loveless, J. Peoples, P. Callahan (Illinois Univ., Urbana), and G. Gladding (Illinois Univ., Urbana) Nov. 1982 8 p
(Contract DE-AC02-76CH-03000)
(DE83-000686; FERMILAB-Pub-82-83-Exp) Avail: NTIS HC A02/MF A01

A measurement of the diffractive psi prime photoproduction cross section is presented. The ratio of the psi prime photoproduction cross section to the psi photoproduction cross section is found to be 0.20 + or 0.05 at an average energy of 150 GeV. Using vector meson dominance, the ratio psi nucleon to psi prime nucleon cross sections is 0.75 + or - 0.12. DOE

N83-32550# Brookhaven National Lab., Upton, N. Y. National Synchrotron Light Source.
ION TIME-OF-FLIGHT SPECTROSCOPY: KRYPTON CHARGE-STATE SPECTRA AS A FUNCTION OF PHOTON EXCITATION

ENERGY NEAR THE K EDGE
J. B. Hastings and V. O. Kostroun (Cornell Univ., Ithaca, N.Y.) 1982 14 p refs Presented at the Intern. Conf. on X-ray and VUV Synchrotron Radiation Instrumentation, Hamburg, 9-13 Aug. 1982
(Contract DE-AC02-76CH-00016)
(DE83-002221; BNL-31970; CONF-820839-5) Avail: NTIS HC A02/MF A01

The charge state distribution resulting from atomic rearrangement followng the creation of the inner shell vacancies in krypton atoms was recorded. Intense, highly collimated, monochromatic and turnable X ray radiation available at the CHESS synchrotron radiation facility at Cornell was used to photoionize krypton atoms in a gas target, and a time of flight spectrometer was used to record the ions in different charge states formed after photoionization. Charge state spectra were recorded at below, at the peak in the K edge and above the edge. Below the edge, charge states + 4 to +7 were observed with appreciable intensity, while at, and above the edge, the charge states ranged from +4 to +10. DOE

N83-32551# Columbia Univ., New York.
SEARCH FOR NEW HEAVY TECHNIPARTICLES
C. Baltay and H. Gordon (BNL) 1982 6 p Presented at the DPF Summer Study on Elementary Particle Phys. and Future Facilities, Aspen, Colo., 28 Jun. 1982
(Contract DE-AC02-76CH-00016)
(DE83-003945; BNL-32263; CONF-8206116-16) Avail: NTIS HC A02/MF A01

An experiment to search for the Technieta (eta/sub T/), which is expected to be in the 100 to 300 GeV mass range is considered in some detail. For the sake of concreteness the predictions of the technicolor models are used; however, it might be better to think of these considerations as an example of the kind of searches that should be carried out with the next generation of hadron-hadron colliders, without putting too much importance on the details of the theoretical models that happen to be in fashion at this time. The general notion of an approximate TeV mass scale and the rough value of the coupling strengths of the new mass scale to the present quarks, leptons, and gluons seem more reliable than details of the particular models. DOE

N83-32552# Ohio State Univ., Columbus. Dept. of Physics.
NEUTRINO MIXING IN GRAND UNIFIED MODELS
K. Tanaka (Helsinki Univ.) 1982 20 p refs Presented at the 8th Intern. Workshop on Weak Interactions and Neutrinos, Javea, Spain, 5-11 Sep. 1982
(Contracts DE-AC02-76ER-01545; EY-76-C-02-1545)
(DE83-004342; DOE/ER-01545/325; CONF-820991-1) Avail: NTIS HC A02/MF A01

Neutrino mixing in grand unified models is discussed. Emphasis is given to the generation of fermion masses and the resulting quark mixing and neutrino mixing angles in grand unified models with scalars and without scalars. L.F.M.

N83-32553# Washington Univ., Seattle.
OSCILLATING NEUTRONS AND DISAPPEARING BARYONS: A THEORETICAL OVERVIEW
D. Seckel and A. Zee May 1982 18 p refs Presented at the Neutron-Antineutron Oscillation Workshop, Cambridge, Mass., 30 Apr. 1982
(Contract DE-AC06-81ER-40048)
(DE83-004929; DOE/ER-40048/17-P2; CONF-820470-3) Avail: NTIS HC A02/MF A01

Baryon and lepton number are accidental symmetries in the standard SU(3) x SU(2) x (U)1 theory. The implications of this for neutron oscillations are discussed and the situation with that in proton decay, is compared. To illustrate our arguments several models where neutron oscillations might be observed with tau/ sub n anti n/ approximately 10 to the 8th power - 10 to the 9th power sec are discussed. In particular, just to prove a point, a grand unified model with neutron oscillation but no proton decay is constructed. DOE

N83-32554# California Univ., Berkeley. Lawrence Berkeley Lab.
TOPICS IN PHENOMENOLOGY OF UNIFIED GAUGE THEORIES OF WEAK, ELECTROMAGNETIC, AND STRONG INTERACTIONS Ph.D. Thesis
Young Suk Kang Nov. 1982 111 p refs
(Contract DE-AC03-76SF-00098)
(DE83-004241; LBL-15244) Avail: NTIS HC A06/MF A01

The neutral current phenomenology of a class of supersymmetric SU(2) x U(1) x U tilde(1) models is analyzed. A model with the simplest fermion and Higgs structure allowing a realistic mass spectrum is considered first. Its neutral current sector is parametrized in terms of two mixing angles and the strength of the new U tilde(1) interactions. Expressions for low energy model independent parameters are derived and compared with those of the standard model. The question of gauge invariance of mass ratios in left-right asymmetric theories is considered. A simple expression is derived for the evolution of the Higgs-fermion-fermion coupling which essentially governs the scale dependence of fermion mass. The production and the subsequent decays of a heavy lepton pair l(+-) near the Z peak in e(+)e(-) annihilation are considered as a test of the standard model. The longitudinal polarization is derived from the spin dependent production cross section, and the decays L yields psi nu and L yields 1 nu nu are used as helicity analyzers. DOE

N83-32555# Stanford Linear Accelerator Center, Calif.
TESTING QUANTUM CHROMODYNAMICS
Stanley J. Brodsky Sep. 1982 18 p refs Presented at the 13th Intern. Symp. on Multiparticle Dyn., Volendam, Netherlands, 6-11 Jun. 1982
(Contract DE-AC03-76SF-00515)
(DE83-004391; SU-SLAC-PUB-2970; CONF-8206136-3) Avail: NTIS HC A02/MF A01

The difficulties in isolating specific quantum chromodynamics (QCD) mechanisms which control hadronic phenomena, and the complications in obtaining quantitative tests of QCD are discussed. A number of novel QCD effects are reviewed, including heavy quark and higher twist phenomena, initial and final state interactions, direct processes, multiparticle collisions, color filtering, and nuclear target effects. The importance of understanding hadron production at the amplitude level is stressed. DOE

N83-32556# Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (West Germany).
FOUR PI PHYSICS WITH THE PLASTIC BALL
H. H. Gutbrod, H. Loehner, A. M. Poskanzer, T. Renner, H. Riedesel, H. G. Ritter, A. Warwick, F. Weik, and H. Wieman Oct. 1982 22 p refs Presented at the Intern. Conf. on Nucleus-Nucleus Collisions, East Lansing, Mich., 26 Sep. - 1 Oct. 1982 and at the Detector Workshop, Berlin, 6-8 Oct. 1982 Prepared in cooperation with LBL, Calif.
(Contract DE-AC03-76SF-00098)
(DE83-004190; LBL-14980; CONF-820979-5; CONF-8210108-1) Avail: NTIS HC A02/MF A01

The 4 pi data taken with the Plastic Ball show that cluster production in relativistic nuclear collisions depends on both the size of the participant volume and the finite size of the cluster. The measurement of the degree of thermalization and the search for collective flow permits the study of the applicability of macroscopic concepts such as temperature and density. DOE

N83-32557# Ames Lab., Iowa. Dept. of Physics.
COULOMB DISSOCIATION IN RELATIVISTIC HEAVY-ION REACTIONS Ph.D. Thesis
Mark T. Mercier Jul. 1982 97 p refs
(Contract W-7405-eng-82)
(DE83-005004; IS-T-1012) Avail: NTIS HC A05/MF A01

Targets of C12, Co59, Y89, Au197, and U238 were bombarded by 2.1 GeV/A H1, C12 and Ne20 projectiles using the SuperHILAC and BEVATRON facilities at Lawrence Berkeley Laboratory (LBL). The beam flux was calculated by monitoring the decay of C11 produced from the C12 (projectile, projectilen) C11 reaction. Residual gamma ray activity from the Co, Y, Au and U targets

was collected in order to trace the decay of several reaction products. The experiment focused on the calculation of cross sections for the formation of products with one neutron removed from the various target nuclei. Corrections to the saturation activity of each product were made for detector efficiency, gamma ray absorption in the target, gamma ray branching, beam geometry and secondary reactions. Results are presented and discussed. DOE

N83-32558# California Univ., Livermore. Lawrence Livermore Lab.
RHEOLOGY VIA NONEQUILIBRIUM MOLECULAR DYNAMICS
William G. Hoover Oct. 1982 15 p refs Presented at the Ann. Meeting of the Soc. of Rheology, Evanston, Ill., 27 Oct. 1982 Sponsored in part by Army Research Office and EPRI
(Contract W-7405-eng-48)
(DE83-004302; UCRL-88315; CONF-8210114-1) Avail: NTIS HC A02/MF A01

The equilibrium molecular dynamics formulated by Newton, Lagrange, and Hamilton has been modified in order to simulate rheological molecular flows with fast computers. This modified Nonequilibrium Molecular Dynamics (NEMD) has been applied to fluid and solid deformations, under both homogeneous and shock conditions, as well as to the transport of heat. The irreversible heating associated with dissipation could be controlled by carrying out isothermal NEMD calculations. The new isothermal NEMD equations of motion are consistent with Gauss' 1829 Least-Constraint principle as well as certain microscopic equilibrium and nonequilibrium statistical formulations due to Gibbs and Boltzmann. Application of isothermal NEMD revealed high-frequency and high-strain rate behavior for simple fluids which resembled the behavior of polymer solutions and melts at lower frequencies and strain rates. For solids NEMD produces plastic flows consistent with experimental observations at much lower strain rates. DOE

N83-32559# Brookhaven National Lab., Upton, N. Y.
PHYSICAL BASIS FOR PROMPT-NEUTRON ACTIVATION ANALYSIS
R. E. Chrien 1982 35 p refs Presented at Am. Nucl. Soc. Winter Meeting, Washington, D.C., 14 Nov. 1982
(Contract DE-AC02-76CH-00016)
(DE83-003938; BNL-32212; CONF-821103-52) Avail: NTIS HC A03/MF A01

The technique called prompt gamma ray neutron activation analysis was applied to rapid materials analysis. The radiation following the neutron radiation capture is prompt in the sense that the nuclear decay time is on the order of 10 to the minus 15th power second, and thus the technique is not strictly activation, but should be called radiation neutron capture spectroscopy or neutron capture gamma ray spectroscopy. Sources and detectors, theory of radiative capture, nonstatistical capture, giant dipole resonance, fast neutron capture, and thermal neutron capture gamma ray spectra are addressed. DOE

N83-32560# Sandia Labs., Albuquerque, N. Mex. Quality Assurance Advanced Planning Div.
QUALITY ASSURANCE PROGRAM FOR ISOTOPIC POWER SYSTEMS
Robert L. Hannigan and Robert R. Harnar Dec. 1982 29 p
(Contract DE-AC04-76DP-00789)
(DE83-005250; SAND-82-1885) Avail: NTIS HC A03/MF A01

The Sandia National Laboratories Quality Assurance Program that applies to non-weapon (reimbursable) Radioisotopic Thermoelectric Generators is summarized. The program was implemented over the past 16 years on power supplies used in various space and terrestrial systems. The quality assurance (QA) activity of the program is in support of the Department of Energy, Office of Space Nuclear Projects. Basic elements of the program are described and examples of program documentation are presented. DOE

N83-32561# Brookhaven National Lab., Upton, N. Y.
DETECTING HEAVY QUARKS
G. Benenson, L. L. Chau, T. Ludlam, F. E. Paige, E. D. Platner, S. D. Protopopescu, and P. Rehak 1983 15 p refs Presented at the DPF Workshop on Collider Detectors: Present Capabilities and Future Possibilities, Berkeley, Calif., 28 Feb. - 4 Mar. 1983
(Contract DE-AC02-76CH-00016)
(DE83-011365; BNL-32870; CONF-830224-8) Avail: NTIS HC A02/MF A01

In this exercise we examine the performance of a detector specifically configured to tag heavy quark (HO) jets through direct observations of D-meson decays with a high resolution vertex detector. To optimize the performance of such a detector, we assume the small diamond beam crossing configuration as described in the 1978 ISABELLE proposal, giving a luminosity of 10(32) cm(+2) sec(+1). Because of the very large backgrounds from light quark (LQ) jets, most triggering schemes at this luminosity require high P/sub perpendicular to/ leptons and inevitably give mission neutrinos. If alternative triggering schemes could be found, then one can hope to find and calculate the mass of objects decaying to heavy quarks. A scheme using the high resolution detector will also be discussed in detail. The study was carried out with events generated by the ISAJET Monte Carlo and a computer simulation of the described detector system. DOE

N83-32562# National Bureau of Standards, Washington, D.C.
STOPPING POWERS AND RANGES OF ELECTRONS AND POSITRONS
M. J. Berger and S. M. Seltzer Dec. 1982 175 p refs Revised Sponsored in part by DOE and Office of Naval Research
(PB83-175687; NBSIR-82-2550-A) Avail: NTIS HC A08/MF A01 CSCL 20H

Tables of stopping powers and related data are given for electrons in 25 elements and 46 mixtures and compounds, and for positrons in 14 materials. The tables include: (1) collision stopping powers (ionization and excitation losses); (2) radiative stopping powers (bremsstrahlung losses); (3) total stopping powers; (4) ranges (rectified pathlengths computed in the continuous-slowing-down approximation); (5) radiation yields (fraction of initial electron energy converted to bremsstrahlung in the course of slowing down); and (6) the logarithmic derivatives of all these quantities with respect to the mean excitation energy of the medium (the key parameter of the Bethe stopping power formula). GRA

N83-32492# Tohoku Univ., Sendai (Japan). Inst. of High Speed Mechanics.
EXACT DIRECT-SIMULATION-SCHEME FOR THE BOLTZMANN EQUATION/CORRELATION OF MOLECULAR VELOCITIES SUBJECT TO RENEWAL PROCESSES
Kenichi Nanbu *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 109-122 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32493# Tohoku Univ., Sendai (Japan). Inst. of High Speed Mechanics.
COUETTE FLOW IN CONTINUUM TO FREE MOLECULAR REGIME
Kenichi Nanbu *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 123-137 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32494# National Aerospace Lab., Tokyo (Japan).
RELAXATION OF VELOCITY DISTRIBUTION OF ELECTRONS COOLED (HEATED) BY ROTATIONAL EXCITATION (DE-EXCITATION) OF N SUB 2
Katsuhisa Koura *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 143-149 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32495# Nagoya Univ. (Japan). Dept. of Aeronautical Engineering.
ON THE INTERPOLATION FORMULA BASED UPON THE

ASYMPTOTIC SOLUTION TO THE KINETIC MODEL EQUATION
Takeo Soga *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 151-158 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32496# Nagoya Univ. (Japan). Dept. of Aeronautical Engineering.
ROTATIONAL TEMPERATURE MEASUREMENTS IN FREE JET EXPANSIONS ON N SUB 2 USING ELECTRON BEAM FLUORESCENCE TECHNIQUE
Takeo Soga, Masaya Takanishi, and Michiru Yasuhara *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 159-168 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32500# National Aerospace Lab., Tokyo (Japan).
MONTE CARLO SIMULATION IN MOLECULAR GAS DYNAMICS
Katsuhisa Koura *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 191-197 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N83-32563# General Accounting Office, Washington, D. C. Resources, Community and Economic Development Div.
REGIONAL LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITES: PROGRESS BEING MADE BUT NEW SITES WILL PROBABLY NOT BE READY BY 1986
11 Apr. 1983 65 p refs
(GAO/RCED-83-48; B-194786) Avail: NTIS HC A04/MF A01

The problems in forming interstate compacts and disposing of low-level wastes are evaluated. The ability to establish new low-level waste disposal facilities is assessed. Alternative contingency plans are recommended. Author

N83-32564# Sandia Labs., Albuquerque, N. Mex.
CORROSION RESISTANT CANISTERS FOR NUCLEAR WASTE ISOLATION
N. J. Magnani 1982 8 p refs Presented at 6th Intern. Symp. on the Sci. Basis for Radioactive Waste Management, Boston, 1 Nov. 1982
(Contract DE-AC04-76DP-00789)
(DE83-000090; SAND-82-1384C; CONF-821107-5) Avail: NTIS HC A02/MF A01

There are two different concepts being evaluated to provide durable canisters for waste disposal: (1) canisters fabricated out of extremely corrosion resistant materials such as Ti-base or Ni-base alloys, and (2) canisters fabricated out of less durable materials but designed with a corrosion allowance. Each of these types of canisters could fail to meet the design objectives through a variety of failure processes. The more important of these are discussed. DOE

N83-32565# California Univ., Berkeley. Lawrence Berkeley Lab. Earth Sciences Div.
THERMAL IMPACT OF WASTE EMPLACEMENT AND SURFACE COOLING ASSOCIATED WITH GEOLOGIC DISPOSAL OF NUCLEAR WASTE
J. S. Y. Wang, D. C. Mangold, R. K. Spencer, and C. F. Tsang Aug. 1982 237 p refs
(Contract DE-AC03-76SF-0098)
(DE83-007314; LBL-13341; NUREG/CR-2910) Avail: NTIS HC A11/MF A01

The thermal effects associated with the emplacement of aged radioactive wastes in a geologic repository were studied, with emphasis on the following subjects: the waste characteristics, repository structure, and rock properties controlling the thermally induced effects; the current knowledge of the thermal, thermomechanical, and thermohydrologic impacts, determined mainly on the basis of previous studies that assume 10-year-old wastes; the thermal criteria used to determine the repository waste loading densities; and the technical advantages and disadvantages of surface cooling of the wastes prior to disposal as a means of mitigating the thermal impacts. The waste loading densities determined by repository designs for 10-year-old wastes are extended to older wastes using the near-field thermomechanical criteria based on room stability considerations. Also discussed are the effects of long surface cooling periods determined on the basis of far-field thermomechanical and thermohydrologic considerations. The extension of the surface cooling period from 10 years to longer periods can lower the near-field thermal impact but have only modest long-term effects for spent fuel. More significant long-term effects can be achieved by surface cooling of reprocessing high-level waste. DOE

N83-32566# California Univ., Livermore. Lawrence Livermore Lab.
THERMONUCLEAR MODEL FOR HIGH ENERGY TRANSIENTS
Stan E. Woosley (California Univ., Santa Cruz) 1982 21 p refs Presented at the Accreting Neutron Star Conf., Garching, West Germany, 19-24 Jul. 1982
(Contract W-7405-eng-48)
(DE83-002814; UCRL-88329; CONF-820747-2) Avail: NTIS HC A02/MF A01

Different regimes of nuclear burning are reviewed, each appropriate to a given range of (steady state) accretion rate. Accretion rates in the range 10 to the -14th power to 10 to the -10th power Msub solar/y all appear capable of producing X-ray transients of various durations and intervals. Modifications introduced by radiatively driven mass loss, the thermal inertial of the envelope, different burning mechanisms, and two dimensional considerations are discussed as are difficulties encountered when the thermonuclear model is confronted with observations of rapidly recurrent bursts, and super-Eddington luminosities and temperatures. Results from a numerical simulation of a combined hydrogen-helium runaway initiated at pycnonuclear density are presented. The thermonuclear model for gamma ray bursts is reviewed and updated, particularly with regard to the breakdown of the steady state hypothesis employed in previous work. Solely on the basis of nuclear instability, gamma ray bursts of various types appear possible for a very broad variety of accretion rates although other considerations may restrict this range. DOE

N83-32567# California Univ., Livermore. Lawrence Livermore Lab.
DISPOSAL COSTS FOR SRP HIGH-LEVEL WASTES IN BOROSILICATE GLASS AND CRYSTALLINE CERAMIC WASTE FORMS
R. B. Rozsa and J. H. Campbell 25 Aug. 1982 10 p refs
(Contract W-7405-eng-48)
(DE83-003105; UCRL-53315) Avail: NTIS HC A02/MF A01

The overall burial costs of the glass and ceramic waste forms, including processing, storage, transportation, packaging, and emplacement in a repository were compared. Amount of waste will require approximately 10,300 standard (24 in. i.d. x 9-5/6 ft length) canisters of waste glass, each containing about 3260 lb of waste at 28% waste loading. The ceramic waste form requires about one-third the above number of standard canisters. Approximately $2.5 billion is required to process and dispose of this waste, and the total cost is independent of waste form (glass or ceramic). The major cost items (about 80% of the total cost) for all cases are capital and operating expenses. The capital and 20-year operating costs for the processing facility are the same order of magnitude, and their sum ranges from about one-half of

the total for the reference glass case to two-thirds of the total for the ceramic cases. DOE

N83-32568# Sandia Labs., Albuquerque, N. Mex.
NUCLEAR-WASTE DISPOSAL: TECHNICAL ISSUES AND STATUS
T. O. Hunter 1982 21 p refs Presented at Inst. for Nucl. Mater. Management Seminar on Spent Fuel Management and Waste Disposal, Washington, D.C., 20 Oct. 1982
(Contract DE-AC04-76DP-00789)
(DE83-002185; SAND-82-2238C; CONF-821090-1) Avail: NTIS HC A02/MF A01

The nuclear waste from the defense programs of the United States and the commercial nuclear fuel cycle are planned for disposal in mined geologic repositories. High-level waste will require the development of one to three repositories. A number of technical issues are associated with the selection and characterization of a suitable site, the design of surface and underground facilities, development of an appropriate waste package, and methods to assess the performance of the system relative to regulatory requirements. These issues are being addressed by four major projects to evaluate salt, basalt, volcanic tuff, and other crystalline rocks such as granite. The key technical issues and the status of activities to resolve those issues are reviewed. DOE

N83-32569# Sandia Labs., Albuquerque, N. Mex.
SYSTEMS OVERVIEW OF THE SUBSEABED DISPOSAL PROGRAM
R. D. Klett, L. H. Brush, J. Lipkin, and C. M. Percival 1982 14 p refs Presented at NWTS Information Meeting on Basalt Waste Isolation Project, Las Vegas, Nev., 14 Dec. 1982
(Contract DE-AC04-76DP-00789)
(DE83-000091; SAND-82-2021C; CONF-821205-5) Avail: NTIS HC A02/MF A01

The Subseabed Disposal Program (SDP) is considering high-level waste (HLW) disposal in the oceanic geologic formations as a possible longer term complement to mined geologic repositories. The approach to safety assessment is to compute occupational exposure for all processes, predict the consequences and probabilities of pre-emplacement accidents and controlled release from the sediments, and analyze of all pathways to man and resulting health effects. Models are being developed to form a physical/mathematical computer description of each process; to measure as well as possible associated phenomena and properties in the laboratory; to make predictions and run confirming in-situ experiments; and to modify predictive methods if required. Models have been developed to describe heat transfer, fluid flow, mechanical response of the sediment, nuclide migration in the sediment, physical and biologic oceanography, land transport accidents, dose to man, and health effects. DOE

N83-32570# Brookhaven National Lab., Upton, N. Y.
NEW ACCELERATORS IN HIGH-ENERGY PHYSICS
John P. Blewett 1982 4 p Presented at the IEEE Nucl. Sci. Symp., Washington, D.C., 20 Oct. 1982
(Contract DE-AC02-76CH-00016)
(DE83-002817; BNL-32073; CONF-821011-23) Avail: NTIS HC A02/MF A01

A few new ideas that appeared during the last few years in the accelerator field are mentioned. A couple are of importance in the design of injectors, usually linear accelerators, for high-energy machines. Some of the somewhat sensational accelerator projects, now in operations, under construction or just being proposed are reveiwed. Finally, a few applications of high-energy accelerators in fields other than high-energy physics are also mentioned. DOE

N83-32571# Los Alamos Scientific Lab., N. Mex. Environmental Science Group.
BIOLOGICAL INTRUSION BARRIERS FOR LARGE-VOLUME WASTE-DISPOSAL SITES
T. E. Hakonson, J. F. Cline, and W. H. Rickard 1982 22 p refs Presented at the Symp. on Low Level Waste Disposal, Washington, 29-30 Sep. 1982 Prepared in cooperation with Battelle Pacific Northwest Labs., Richland, Wash.
(Contract W-7405-eng-36)
(DE83-002061; LA-UR-82-2971; CONF-820911-2) Avail: NTIS HC A02/MF A01

Intrusion of plants and animals into shallow land burial sites with subsequent mobilization of toxic and radiotoxic materials has occurred. Based on recent pathway modeling studies, such intrusions can contribute to the dose received by man. Past work on developing biological intrusion barrier systems for application to large volume waste site stabilization is described. State of the art concepts employing rock and chemical barriers are discussed relative to long term serviceability and cost of application. The interaction of bio-intrusion barrier systems with other processes affecting trench cover stability are discussed to ensure that trench cover designs minimize the potential dose to man. DOE

N83-32572# Idaho National Engineering Lab., Idaho Falls.
ENVIRONMENTAL EVALUATION OF ALTERNATIVES FOR LONG-TERM MANAGEMENT OF DEFENSE HIGH-LEVEL RADIOACTIVE WASTES AT THE IDAHO CHEMICAL PROCESSING PLANT
Sep. 1982 665 p refs
(Contract DE-AC07-79ID-01675)
(DE83-002504; IDO-10105) Avail: NTIS HC A99/MF A01

The U.S. Department of Energy (DOE) is considering the selection of a strategy for the long-term management of the defense high-level wastes at the Idaho Chemical Processing Plant (ICPP). This report describes the environmental impacts of alternative strategies. These alternative strategies include leaving the calcine in its present form at the Idaho National Engineering Laboratory (INEL), or retrieving and modifying the calcine to a more durable waste form and disposing of it either at the INEL or in an offsite repository. This report addresses only the alternatives for a program to manage the high-level waste generated at the ICPP. 24 figures, 60 tables. DOE

N83-32573# Hanford Engineering Development Lab., Richland, Wash.
ASSESSMENT OF SPENT-FUEL WASTE-FORM/STABILIZER ALTERNATIVES FOR GEOLOGIC DISPOSAL
R. E. Einziger and D. A. Himes Sep. 1982 171 p refs
(Contract DE-AC06-76FF-02170)
(DE83-002458; HEDL-TME-81-43) Avail: NTIS HC A08/MF A01

The possibility of burying canisterized unreprocessed spent fuel in a deep geologic repository is studied. One aspect is an assessment of the possible spent fuel waste forms. The fuel performance portion was to evaluate five candidate spent fuel waste forms for postemplacement performance with emphasis on their ability to retard the release of radiouclides to the repository geology. Spent fuel waste forms under general consideration were: (1) unaltered fuel assembly; (2) fuel assembly with end fittings removed to shorten the length; (3) rods vented to remove gases and resealed; (4) disassembled fuel bundles to close pack the rods; and (5) rods chopped and fragments immobilized in a matrix material. DOE

N83-32574# Los Alamos Scientific Lab., N. Mex.
OVERVIEW ASSESSMENT OF NUCLEAR-WASTE MANAGEMENT
B. W. Burton, V. P. Gutschick, B. A. Perkins, C. L. Reynolds, J. C. Rodgers, J. G. Steger, T. K. Thompson, L. K. Trocki, E. M. Wewerka, and M. L. Wheeler Aug. 1982 96 p refs
(Contract W-7405-eng-36)
(DE83-004472; LA-9395-MS) Avail: NTIS HC A05/MF A01

The environmental control technologies associated with Department of Energy nuclear waste management programs were reviewed and the most urgent problems requiring further action or follow up were identified. In order of decreasing importance they are: (1) shallow land disposal technology development; (2) active uranium mill tailings piles; (3) uranium mine dewatering; (4) site decommissioning; (5) exhumation/treatment of transuranic waste at Idaho National Engineering Laboratory; (6) uranium mine spoils; and (7) medical/institutional wastes. DOE

N83-32575# Los Alamos Scientific Lab., N. Mex.
FLIGHT-SYSTEMS SAFETY PROGRAM Progress Report, Jul. 1982
S. E. Bronisz, comp. Jul. 1982 13 p
(Contract W-7405-eng-36)
(DE83-001916; LA-9550-PR) Avail: NTIS HC A02/MF A01

This technical monthly report covers studies related to the use of Pu 23802 in radoisotope power systems carried out for the Office of Space Nuclear Projects of the US Department of Energy by Los Alamos National Laboratory. DOE

N83-32576# Pacific Northwest Lab., Richland, Wash.
RELEVANCE OF BIOTIC PATHWAYS TO THE LONG-TERM REGULATION OF NUCLEAR-WASTE DISPOSAL. TOPICAL REPORT ON REFERENCE WESTERN ARID LOW-LEVEL SITES
D. H. McKenzie, L. L. Cadwell, L. E. Eberhardt, W. E. Kennedy, Jr., R. A. Peloquin, and M. A. Simmons Oct. 1982 102 p refs
(Contract DE-AC06-76RL-01830)
(DE83-002575; NUREG/CR-2675-Vol-2; PNL-4241-Vol-2) Avail: NTIS HC A06/MF A01; Also Avail: SOD $5.50

An order of magnitude estimate for the potential dose to man resulting from biotic transport mechanisms at a reference western arid lowlevel waste site was developed. A description of the reference site is presented that includes the waste inventories, site characteristics and biological communities. Parameter values for biotic transport processes are based on data reported in current literature. Transport and exposure scenarios are developed for assessing biotic transport during 100 years following site closure. Calculations of radionuclide decay and waste container decomposition are made to estimate the quantities available for biotic transport. Dose to a man occupying the reference site following the 100 years of biotic transport are calculated. Dose to man estimates as a result of biotic transport are estimated to be of the same order of magnitude as the dose resulting from the more commonly evaluated human intrusion scenario. DOE

74 OPTICS

Includes light phenomena.

N83-32577* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INTERFEROMETRIC ANGLE MONITOR Patent
Peter O. Minott, inventor (to NASA) Issued 26 Jul. 1983 6 p Filed 8 Oct. 1980 Supersedes N81-12386 (19 - 03, p 0346)
(NASA-Case-GSC-12614-1; US-Patent-4,395,123; US-Patent-Appl-SN-195227; US-Patent-Class-356-353; US-Patent-Class-356-363) Avail: US Patent and Trademark Office CSCL 20F

Two mutually coherent light beams formed from a single monochromatic light source were directed to a reflecting surface of a rotatable object. They were reflected into an imaging optical lens having a focal plane optically at infinity. A series of interference fringes were formed in the focal plane which were translated linearly in response to angular rotation of the object. Photodetectors were located adjacent the focal plane to detect the fringe translation and output a signal in response to the translation. The signal was fed to a signal processor which was adapted to count the number of fringes detected and develop a measure of the angular rotation and direction of the object.
Official Gazette of the U.S. Patent and Trademark Office

N83-32578 Sira Inst. Ltd., Chislehurst (England). Optical Systems Dept.
THREE LASER SCANNING INSTRUMENTS FOR AUTOMATIC SURFACE INSPECTION
R. N. West Jun. 1983 9 p Presented at Soc. of Photo-Opt. Instrumentation Engr. (SPIE) 1983 Intern. Tech. Conf./Europe, Geneva, 18-22 Apr. 1983
Copyright. Avail: Issuing Activity

Optical features of laser scanners for the inspection of surfaces are described. The first instrument is a pinhole detector for strip materials which can also be used for surface inspection. Two independent alternate scan lines are produced to highlight holes of various angles within the strips. A light guide collection system collects the transmitted light, and an acousto-optic modulator reduces the laser beam power when the scan is beyond the edges of the strip. An ancillary channel of the instrument collects part of the specular light reflected from the strip surface of one of the two scans and, by means of a double reflection at the inspected surface, such effects as gross tilt and heave of the strip do not affect the inspection process. Another strip inspection instrument using two scan lines is employed to detect all classes of defect in clear strip. The scan of the light transmitted by linear gratings should normally be constant and any deviation from this indicates the presence of defects in the strip. The third instrument was designed to inspect the internal surfaces of cylinder bores for surface defects, the position and size of ports and surface finish. Two versions are described, one using a probe containing a single clad optical rod and a second with a more complex fiber optic assembly. Author (ESA)

N83-32579# Hughes Research Labs., Malibu, Calif.
REAL-TIME IMPLEMENTATION OF NONLINEAR OPTICAL PROCESSING FUNCTIONS Annual Technical Report, 15 Jun. 1981 - 15 Jun. 1982
B. H. Soffer Dec. 1982 71 p refs
(Contract F49620-81-C-0086; AF Proj. 2305)
(AD-A127024; AFOSR-83-0249TR) Avail: NTIS HC A04/MF A01 CSCL 20/6

Optical data processing has not yet achieved its potential of increased capacity and speed compared with conventional electronic techniques, primarily for lack of a practical real-time image modulator, and because optical techniques have been almost exclusively limited to linear operations. The continuing research outlined in this report attacks these issues by studying the implementation of real-time nonlinear parallel-processing techniques. The various implementations studied in this program all employed real-time liquid-crystal light valves developed and specially modified for these tasks. GRA

N83-32580# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
BINOCULAR SHADING AND VISUAL SURFACE RECONSTRUCTION
W. E. L. Grimson Aug. 1982 25 p refs
(Contract N00014-80-C-0505)
(AD-A127058; AI-M-697) Avail: NTIS HC A02/MF A01 CSCL 20/6

Zero-crossing or feature-point based stereo algorithms can, by definition, determine explicit depth information only at particular points in the image. To compute a complete surface description, this sparse depth map must be interpolated. A computational theory of this interpolation or reconstruction process, based on a surface consistency constraint, has previously been proposed. In order to provide stronger boundary conditions for the interpolation process, other visual cues to surface shape are examined in this paper. In particular, it is shown that, in principle, shading information from the two views can be used to determine the orientation of the surface normal along the feature-point contours, as well as the parameters of the reflective properties of the surface material. The numerical stability of the resulting equations is also examined. Author (GRA)

N83-32581# Calspan Advanced Technology Center, Buffalo, N.Y.
IR AND VISIBLE WAVELENGTH OBSCURATION BY PYROTECHNICALLY GENERATED ALKALI-HALIDE SMOKES
J. T. Hanley, J. N. Kile, B. J. Wattle, and E. J. Mack Jan. 1983 26 p refs
(Contract N00014-82-C-2108)
(AD-A127616; AD-E001412; CALSPAN-7031-M-1) Avail: NTIS HC A03/MF A01 CSCL 17/5

In pursuit of an effective IR wavelength screen and an increased

understanding of the particle formation mechanisms and resultant size distribution, this year's efforts focused on two primary objectives: (1) Through a series of chamber tests, assess the visible and IR wavelength extinction characteristics of four recently developed NWC pyrotechnics: LiC1 1, LM9, LM11 and LM12 and (2) Through a series of chamber tests conducted by Calspan with participants from NRL and NWC, investigate the smoke particle size distribution as functions of pyrotechnic and associated burn parameters. GRA

N83-32582# State Univ. of New York, Buffalo. Dept. of Psychology.
ENHANCING PERCEPTIBILITY OF BARELY PERCEPTIBLE TARGETS Final Technical Report, 1 Jun. 1981 - 31 Aug. 1982
Naomi Weisstein 28 Dec. 1982 81 p refs
(Contract MDA903-81-C-0320; DARPA Order 3894)
(AD-A127569) Avail: NTIS HC A04/MF A01 CSCL 17/5

A major virtue of our enhancement procedures is that targets do not have to be restricted to a fixed location nor does the exact location have to be known or discovered beforehand. This is obvious in the case of temporal manipulations, but it applies in general to our spatial manipulations as well. Contours that make an image region appear three dimensional or that divide an image into figure and ground can be placed within a general area, or moved from region to region as the task requires. We found a similar lack of constraint on the types of images amenable to our enhancement procedures. Our procedures worked with such dissimilar images as randomly placed dots and short vectors, synthetic aperture radar images, small diagonal line segments, fragmented forms, and digitized photographs of faces, roadways, tanks and trucks obscured by various types of noise. Our work on this contract suggests that we can develop a large, varied, and flexible stockpile of image enhancement techniques. There are many different ways of imparting visual meaning to an image. There are many different image types amenable to enhancement. Our findings may prove applicable to such disparate situations as picking up key words or sentences in documents, spotting faces in a crowd, identifying objects in aerial reconnaissance, surveillance and badly damaged photographs, recognizing marginal video and facsimile transmissions, and interpreting camouflaged images. GRA

N83-32583# Advanced Information and Decision Systems, Mountain View, Calif.
INTELLIGENT INTERPRETATION OF 3-D IMAGERY Final Report, 1 Apr. - 31 Dec. 1982
Darwin Kuan and Robert Drazovich Feb. 1983 92 p refs
(Contract F49620-82-C-0071; AF Proj. 2304)
(AD-A127710; AFOSR-83-0331TR; AI/DS-1027-1) Avail: NTIS HC A05/MF A01 CSCL 20/6

This report documents the research efforts of Advanced Information & Decision Systems (AI&DS) to develop three dimensional (3-D) object classification techniques for vehicle targets in air-to-ground laser range imagery. The authors emphasize an artificial intelligence (AI) approach to intelligently interpret laser imagery in terms of 3-D symbolic models. The full classification system includes 3-D image feature extraction, geometric modeling, model prediction, and feature-to-model matching. This report discusses new techniques for implementing these major system components, and provides overall conclusions and discussion about the feasibility of developing an automated 3-D object classification system. GRA

N83-32584# Polytechnic Inst. of New York, Brooklyn. Dept. of Mechanical and Aerospace Engineering.
TRANSVERSE AND QUANTUM EFFECTS IN SUPERFLUORESCENCE: PUMP DYNAMICS FOR THREE-LEVEL SUPERFLUORESCENCE; AN ALGORITHM FOR TRANSVERSE, FULL TRANSIENT EFFECTS IN OPTICAL BISTABILITY IN A FABRY-PEROT CAVITY Final Report, Sep. 1979 - 31 Jan. 1983
F. P. Mattar (MIT) 11 Apr. 1983 270 p refs
(Contract DAAG29-79-C-0148)
(AD-A127502; ARO-16800.19-PH; POLY-M/AE-83-4; REPT-3) Avail: NTIS HC A12/MF A01 CSCL 20/6

Computational methodologies were developed to treat rigorously (1) transverse boundary in an inverted (amplifying) media; (2) to treat quantum fluctuations in an initial boundary conditions in the light-matter interactions problem; (3) construct a two-laser three-level code to study light control by light effect; (4) construction of a data base that (a) would manage the production of different types of laser calculations; cylindrical, cylindrical with atomic frequency broadening, cartesian geometry; all of the above with quantum mechanical initiation), (b) allow parametric comparison within the same type of calculations, by establishing a unifying protocol of software storage, of the various refinements of the model could be contrasted among themselves and with experiment; and (5) construct an algorithm for counterbeam transient studies for optical bistability and optical oscillator studies. Author (GRA)

N83-32585# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COMPUTER OPTICAL FIBER DATA TRANSMISSION SYSTEM
Dong Weiguang, Hu Wenjin, Zhang Wenlan, and Ren Keyun 8 Mar. 1983 11 p Transl. into ENGLISH from Dianzi Jishu Yingyong (China), no. 7, 1982 p 16, 37-38
(AD-A127724; FTD-ID(RS)T-1753-82) Avail: NTIS HC A02/MF A01 CSCL 20/6

Optical fiber data transmission equipment used for computer output data transmission with a transmission rate of one million bits per second is discussed. The device was used to connect the DJS-130 computer with the external output device. The system was tested in a complicated electrical environment for one year with satisfactory results. The system uses the transmission method which involves the parallel transmission of a data signal and clock signal by an optical fiber. R.J.F.

N83-32586# California Univ., San Diego, La Jolla. Dept. of Chemistry.
PICOSECOND X-RAY GENERATION FROM PICOSECOND PHOTOELECTRON PULSES
Steve Williamson (Rochester Univ.), Gerard Mourou (Rochester Univ.), Charles G. Dupuy, Philippe Bado, and Kent R. Wilson Apr. 1983 10 p refs Submitted for publication Sponsored in part by Exxon Research and Engineering Co., General Electric Co., Northeast Utilities, New York State Energy Research and Development Authority, Standard Oil Co. and Empire State Electric Energy Research Corp., NSF and the Swiss National Foundation
(Contract N00014-78-C-0325)
(AD-A128031; TR-14) Avail: NTIS HC A02/MF A01 CSCL 20/6

An X-ray source capable of producing picosecond range pulse widths at high repetition rates is demonstrated. Picosecond light pulses are converted to picosecond electron pulses which are then accelerated onto a target to produce X-rays. Using a conventional PIN diode, a time duration of less than 300 psec is observed for Al Kalpha X-ray emission. This X-ray source has potential applications for fast dynamic measurements of light-induced structural changes and for characterizing picosecond X-ray diagnostic equipment. GRA

N83-32587# Institute for Defense Analyses, Alexandria, Va. Science and Technology Div.
EVALUATION OF INFRARED TARGET DISCRIMINATION ALGORITHMS Final Report, May 1982 - Feb. 1983
Irvin W. Kay Apr. 1983 131 p refs
(AD-A128283; AD-E500581; IDA/HQ-83-25281; IDA-P-1714) Avail: NTIS HC A07/MF A01 CSCL 12/1

This paper is concerned with the evaluation of algorithms used by passive infrared sensors to discriminate between signals due to target sources and those due to background clutter. The discussion is essentially restricted to the case of point targets. The goal is to obtain a rough estimate of performance against minimum standards. For this purpose the analysis assumes a simple mathematical model for the background clutter distribution: namely, that it is multivariate Gaussian over the spatial and spectral data

channels provided by the sensor. The paper also discusses experimental evidence for and against such a model, as well as certain more explicit statistical models that have been proposed for the spatial distribution of clutter. Other topics discussed are CFAR optimum processing, linear filters, the effect of using ratios of spectral components for processing in multi-color systems rather than the components, themselves, and background normalization. Also discussed is the relationship between the effectiveness of tracking algorithms and the preliminary screening of targets by CFAR detection algorithms. GRA

N83-32588# Harry Diamond Labs., Adelphi, Md.
ENVIRONMENTAL STANDARDS FOR ELECTRO-OPTICAL SYSTEMS
Robert G. Humphrey and William H. Pepper Apr. 1983 85 p refs
(DA Proj. 154-63749-D-462; HDL Proj. 330933)
(AD-A127776; HDL-TR-2007) Avail: NTIS HC A05/MF A01 CSCL 20/6

The Harry Diamond Laboratories of the U.S. Army electronics Research and Development Command was tasked to help develop standard environmental conditions pertaining to limited visibility operations, for training, research, development, and analysis. This task was part of an effort to ensure use of realistic battlefield environmental conditions throughout the Army. To support this effort, this report provides background information, definitions, criteria for setting standards, and data for selected environmental conditions. The definitions of standards are based on an extension to system operability of the definitions given for physical survivability in Army Regulation AR 70-38, Research, Development, Test, and Evaluation of Material for Extreme Climatic Conditions. The objective is to have a procedure for determining the probability of successful performance of signal links of weapon systems that can be affected by environment. Data presented here include those environmental parameters that affect the performance of electro-optical links of military systems. These parameters include transmission and reflectance data. Transmission data are provided for visibility, ceiling, rain and snow rates, and humidity. These data are provided in terms of risk that a given level will be exceeded, based on the definitions of AR 70-38. Author (GRA)

N83-32589# Pennsylvania State Univ., University Park. Applied Research Lab.
A LIGHT-SCATTERING SYSTEM TO MEASURE CAVITATION NUCLEI: ANALYSIS AND CALIBRATION Thesis
C. B. Yungkurth 30 Sep. 1982 116 p refs
(Contract N00024-79-C-6043)
(AD-A127946; ARL/PSU/TM-82-204) Avail: NTIS HC A06/MF A01 CSCL 20/6

An investigation is made into the problem of measurement inaccuracies of a Light-Scattering System (LSS) that can be utilized to measure cavitation nuclei in terms of microbubble populations. The principle of the system whereby the magnitude of scattered light from an incident laser beam illuminating a microbubble is correlated with the microbubble size has been developed and demonstrated by A. Keller. However, the goal of this investigation is to increase the reliability of the LSS by minimizing several of the inaccuracies. Modifications to the LSS are proposed to minimize system inaccuracies. One is a dual-detector signal analysis system to facilitate the screening out of solid particulate or non-microbubble nuclei from the total nuclei distribution being measured. The other is a mathematical technique called an inversion scheme used to correct inaccurate nuclei count rates reported by the system due to the Probe volume not having a uniform light intensity distribution. Results are presented from a series of rigorous experiments conducted to test the effectiveness of the proposed modifications. In these experiments, the modified LSS is used to measure many different nuclei distributions in a highly controlled environment with a holography system being used to calibrate the LSS test results. GRA

N83-32590# California Univ., Berkeley. Lawrence Berkeley Lab.
DESIGN CONSIDERATIONS FOR A HIGH-SPATIAL-RESOLUTION POSITRON CAMERA WITH DENSE-DRIFT-SPACE MWPC'S
A. DelGuerra, V. Perez-Mendez, G. Schwartz, and W. R. Nelson (Stanford Linear Accelerator Center) Oct. 1982 14 p refs Presented at the IEEE Nucl. Sci. Symp., Washington, D.C., 20 Oct. 1982
(Contract DE-AC03-76SF-00098)
(DE83-003051; LBL-14414; CONF-821011-17) Avail: NTIS HC A02/MF A01

A multiplane Positron Camera is proposed, made of six MWPC modules arranged to form the lateral surface of a hexagonal prism. Each module (50 x 50 sq cm) has a 2 cm thick lead-glass tube converter on both sides of a MWPC pressurized to 2 atm. Experimental measurements are presented to show how to reduce the parallax error by determining in which of the two converter layers the photon has interacted. The results of a detailed Monte Carlo calculation for the efficiency of this type of converter are shown to be in excellent agreement with the experimental measurements. The expected performance of the Positron Camera is presented: a true coincidence rate of 56,000 counts/s (with an equal accidental coincidence rate and a 30% Compton scatter contamination) and a spatial resolution better than 5.0 mm (FWHM) for a 400 micron Ci pointlike source embedded in a 10 cm radius water phantom. DOE

N83-32591# Brookhaven National Lab., Upton, N. Y. Medical Dept.
DUAL 7 PINHOLE TOMOGRAPHY
Y. Bizais, I. G. Zubal, R. W. Rowe, G. W. Bennett, and A. B. Brill 1982 4 p refs Presented at the IEEE Nucl. Sci. Symp., Washington, D.C., 20-22 Oct. 1982
(Contract DE-AC02-76CH-00016)
(DE83-004589; BNL-32214; CONF-821011-25) Avail: NTIS HC A02/MF A01

Emission tomography using two orthogonal sets of projections through seven pinhole collimators is considered. The acquisition system is described along with the reconstruction algorithm and presents results obtained in phantom studies. The advantages of this method over conventional Seven Pinhole Tomography are discussed. DOE

N83-32592# Brookhaven National Lab., Upton, N. Y.
HIGH-RESOLUTION X-RAY SCATTERING
D. E. Moncton and G. S. Brown (Stanford Synchrotron Radiation Lab.) 1982 24 p refs Presented at the Intern. Conf. on X-Ray and VUV Synchrotron Radiation Instrumentation, Hamburg, 9 Aug. 1982 Prepared in cooperation with Bell Telephone Labs., Murray Hill, N.J.
(Contract DE-AC02-76CH-00016)
(DE83-004599; BNL-32304; CONF-820839-6) Avail: NTIS HC A02/MF A01

Beamline and spectrometer instrumentation for high resolution X-ray scattering at the Stanford Synchrotron Radiation Laboratory is described. The combination of photon intensity at the sample of approximately 10 to the 13th power photons/sec/10 sq mm and the momentum transfer resolution of delta Q approximately 10 to the -4th power 1/A make this a unique facility. Examples are given of data obtained on two dimensional phase transitions both in studies of thin (2 molecular layers) liquid crystal films and rare gas monolayers on pyrolytic graphite substrates. DOE

N83-32593# California Univ., Berkeley. Lawrence Berkeley Lab.
LUMINOSITY OF CONTINUOUS BEAMS WITH CROSSING ANGLE
Lloyd Smith Oct. 1982 3 p refs Presented at the DPF Summer Study on Elementary Particle Phys. and Future Facilities, Aspen, Colo., 28 Jun. 1982
(Contract DE-AC03-76SF-00098)
(DE83-003279; LBL-15045; CONF-8206116-7) Avail: NTIS HC A02/MF A01

Since it appears difficult to reach a luminosity of even 10 to the 32nd power/cm sec with (p, anti p) in a single ring if the number of events per bunch collision should not exceed unity, it

seems appropriate to ask what could be done with two continuous beams in independent rings, ISR style. This subject was treated at some length in the first ICFA report by Keil and King, based on an optimization procedure developed earlier by Keil. In this note, a different approach is taken by considering the length of the interaction diamond and the luminosity to be of primary importance and relating the other parameters to them. DOE

N83-31696# Amsterdam Univ. (Netherlands). Van der Waals Lab.
OPTICAL INVESTIGATION OF CRITICAL BEHAVIOR IN SIMPLE FLUIDS AT REDUCED GRAVITY
P. H. Huijser, A. C. Michels, and N. J. Trappeniers *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 377-384 refs Sponsored by Netherlands Agency for Aerospace Programs (NIVR) (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N83-32594# General Accounting Office, Washington, D. C. Resources, Community and Economic Development Div.
STATUS OF DOE'S IMPLEMENTATION OF THE MAGNETIC FUSION ENERGY ENGINEERING ACT OF 1980
29 Apr. 1983 37 p refs
(GAO/RCED-83-105; B-210947) Avail: NTIS HC A03/MF A01

Federal magnetic fusion energy research is reviewed. Author

N83-32595*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE INNER EDGE OF THE PLASMA SHEET AND THE DIFFUSE AURORA
D. H. Fairfield and A. F. Vinas Jun. 1983 51 p refs Submitted for publication
(NASA-TM-85062; NAS 1.15:85062) Avail: NTIS HC A04/MF A01 CSCL 20I

Three dimensional measurements from the ISEE-1 low energy electron spectrometer are used to map the location of the inner edge of the plasma sheet and study the anisotropies in the electron distribution function associated with this boundary. Lower energy plasma sheet electrons have inner edges closer to the Earth than higher energies with the separations at different energies being larger near dawn and after dusk than at midnight. Lowest energy inner edges are frequently located adjacent to the plasmapause in the dawn hemisphere but are often separated from it in the dusk hemisphere by a gap of at least several Re. The energy dispersion is minimal in the afternoon quadrant where the inner edge is near the magnetopause and frequently oscillating on a time scale of minutes. The location of the inner edge is probably determined primarily by the motion of electrons in the existing electric and magnetic fields rather than by strong diffusion as has sometimes been supposed. Author

N83-32596# Naval Research Lab., Washington, D. C. Plasma Physics Div.
GENERATION OF ENHANCED-SCALELENGTH PLASMAS AND ZEEMAN STUDY OF MAGNETIC FIELDS
J. A. Stamper, E. A. McLean, S. P. Obenschain, H. R. Griem, C. K. Manka, D. W. Droemer, and Mark J. Herbst 31 Mar. 1983 22 p Presented at the 12th Ann. Anomalous Absorption Conf., Santa Fe, N. Mex., 10-13 May 1982 Sponsored in part by DOE and Defense Nuclear Agency
(AD-A127951; NRL-MR-4898) Avail: NTIS HC A02/MF A01 CSCL 20/3

Using nonuniform laser illumination on flat targets, with moderate laser energies (200J), we have produced enhanced density scalelengths; e.g., in excess of 0.5 mm at 0.1 of critical density. These enhanced scalelengths are of interest in simulating large, high-gain pellets, and investigating the potential impact of longer scalelengths on a variety of convective plasma instabilities. The non-uniform laser irradiation also affects the spontaneous magnetic fields. These fields were measured for the first time using the Zeeman effect. Space-and-time-resolved measurements, for both polarizations, were made of the 2271-2278 A CV triplet emission. A comparison with theory gave fields around 200 kG. Author (GRA)

N83-32597# Oak Ridge National Lab., Tenn. Fusion Energy Div.
CONSTRAINED RIPPLE OPTIMIZATION OF TOKAMAK BUNDLE DIVERTORS
L. M. Hively, J. A. Rome, V. E. Lynch, J. F. Lyon, R. H. Fowler, Y-K. M. Peng, and R. A. Dory Feb. 1983 58 p refs
(Contract W-7405-eng-26)
(DE83-006363; ORNL/TM-7898) Avail: NTIS HC A04/MF A01

Magnetic field ripple from a Tokamak bundle divertor is localized to a small toroidal sector and must be treated differently from the usual (distributed) toroidal field (TF) coil ripple. Generally, in a Tokamak with an unoptimized divertor design, all of the banana-trapped fast ions are quickly lost due to banana drift diffusion or to trapping between the 1/R variation in absolute value vector B XI B and local field maxima due to the divertor. A computer code has been written to optimize automatically on-axis ripple subject to these constraints, while varying up to nine design parameters. Optimum configurations have low on-axis ripple (less than 0.2%) so that, now, most banana-trapped fast ions are confined. Only those ions with banana tips near the outside region (absolute value theta <) or equal to 45 deg are lost. However, because finite-sized TF coils have not been used in this study, the flux bundle is not expanded. DOE

N83-32598# Georgia Inst. of Tech., Atlanta. School of Nuclear Engineering.
SATURATED TEARING MODES IN TOKAMAKS WITH DIVERTORS
G. Bateman Dec. 1982 8 p refs
(Contract DE-AS05-81ER-53117)
(DE83-005589; DOE/ER-53117/T1) Avail: NTIS HC A02/MF A01

A self-consistent theory of saturated tearing modes capable of predicting multiple magnetic island widths in Tokamaks with no assumptions on the cross-sectional shape, aspect ratio, or plasma pressure is developed. This algorithm is being implemented in the form of a computer code. It is proposed: (1) to complete, refine, document and publish this computer code; (2) to carry out a survey in which the current profile, aspect ratio, cross-sectional shape, and pressure profile are varied in order to determine their effect on saturated tearing mode magnetic island widths; and (3) to determine the effort of some externally applied magnetic perturbation harmonics on these magnetic island widths. Particular attention is paid to the coupling between different helical harmonics, the effect of multiple magnetic islands on the profiles of temperature, pressure and current, and the potential of magnetic island overlap leading to a disruptive instability. DOE

N83-32599# Department of Energy, Washington, D. C. Office of Fusion Energy.
MAGNETIC FUSION ENERGY AND COMPUTERS. THE ROLE OF COMPUTING IN MAGNETIC FUSION ENERGY RESEARCH AND DEVELOPMENT
Jan. 1983 156 p refs Revised
(DE83-006565; DOE/ER-0159) Avail: NTIS HC A08/MF A01

This report documents the structure and uses of the MFE Network and presents a compilation of future computing requirements. Its primary emphasis is on the role of supercomputers in fusion research. One of its key findings is that with the introduction of each successive class of supercomputer, qualitatively improved understanding of fusion processes has been gained. At the same time, even the current Class VI machines severely limit the attainable realism of computer models. Many important

problems will require the introduction of Class VII or even larger machines before they can be successfully attacked. DOE

N83-32600# Princeton Univ., N. J. Plasma Physics Lab.
CONTINUOUS TOKAMAK OPERATION WITH AN INTERNAL TRANSFORMER
C. E. Singer and D. R. Mikkelsen Oct. 1982 35 p refs
(Contract DE-AC02-76CH-03073)
(DE83-002340; PPPL-1936) Avail: NTIS HC A03/MF A01

A large improvement in efficiency of current drive in a Tokamak can be obtained using neutral beam injection to drive the current in a plasma which has low density and high resistivity. The current established under such conditions acts as the primary of a transformer to drive current in an ignited high-density plasma. In the context of a model of plasma confinement and fusion reactor costs, it is shown that such transformer action has substantial advantages over strict steady-state current drive. It is also shown that cycling plasma density and fusion power is essential for effective operations of an internal transformer cycle. Fusion power loading must be periodically reduced for intervals whose duration is comparable to the maximum of the particle confinement and thermal inertia timescales for plasma fueling and heating. The design of neutron absorption blankets which can tolerate reduced power loading for such short intervals is indentified as a critical problem in the design of fusion power reactors. DOE

N83-32601# Oak Ridge National Lab., Tenn.
PLASMA-EDGE STUDIES IN ISX-B AND EBT-S USING SURFACE PROBES AND LASER-INDUCED FLUORESCENCE
J. B. Roberto Aug. 1974 14 p refs Presented at Symp. on Effective Utilization of Surface Analysis Tech. in Plasma Surface Interactions, Sapporo, Japan, 4 Oct. 1982
(Contract W-7405-eng-26)
(DE83-821045; CONF-821045-2-Draft) Avail: NTIS HC A02/MF A01

Surface probe and laser-induced fluorescence measurements in ISX-B and EBT-S have made significant contributions to the understanding of plasma edge characteristics and plasma-surface interactions in these devices. Where comparison is possible, these techniques have led to results which are consistent with plasma diagnostics. Charge-exchange neutral sputtering and self-ion sputtering have been identified as the dominent heavy impurity release mechanisms in ISX-B and EBT-s, respectively. DOE

N83-32602# Idaho National Engineering Lab., Idaho Falls.
CONCEPTUAL DESIGN REPORT FOR A FUSION ENGINEERING DEVICE
K. D. Watts, L. S. Masson, and R. S. McPherson Oct. 1982 68 p refs
(Contract DE-AC07-76ID-01570)
(DE83-002288; EGG-FT-6008) Avail: NTIS HC A04/MF A01

Design requirements, trade studies, design descriptions, conceptual designs, and cost estimates have been completed for the Fusion Engineering Device sector handling machine, movable manipulator system, subcomponent handling machine, and limiter blade handling machine. This information will be used by the Fusion Engineering Design Center to begin to determine the cost and magnitude of the effort required to perform remote maintenance on the Fusion Engineering Device. The designs presented are by no means optimum, and the costs estimates are rough order of magnitude. DOE

N83-32603# Los Alamos Scientific Lab., N. Mex.
NONCANONICAL HAMILTONIAN FORMULATION OF IDEAL MAGNETOHYDRODYNAMICS
Darryl D. Holm and Boris A. Kuperschmidt 1982 10 p refs Presented at the CNLS Order in Chaos Conf., Los Alamos, Nev., 24-28 May 1982
(Contract W-7405-eng-36)
(DE83-000649; LA-UR-82-2654; CONF-8305121-3) Avail: NTIS HC A02/MF A01

A noncanonical Poisson structure for ideal magnetohydrodynamics is presented and identified with a differential Lie algebra. DOE

N83-32604# Los Alamos Scientific Lab., N. Mex.
ADIABATIC COMPRESSION OF ELONGATED FIELD-REVERSED CONFIGURATIONS
R. L. Spencer, M. Tuszewski, and R. K. Linford 1982 5 p refs Presented at the 5th Symp. on Phys. and Technol. of Compact Toroids in the Magnetic Fusion Energy Program, Bellevue, Wash., 16-18 Nov. 1982
(Contract W-7405-eng-36)
(DE83-003533; LA-UR-82-3380; CONF-821124-6) Avail: NTIS HC A02/MF A01

The simplest model of plasma dynamics is the adiabatic model. In this model the plasma is assumed to be in MHD equilibrium at each instant of time. The equilibria are connected by the requirement that they all have the same entropy per unit flux, i.e., the equilibria form a sequence generated by adiabatic changes. The standard way of computing such a sequence of equilibria was developed by Grad, but its practical use requires a fairly complicated code. It would be helpful if approximately the same results could be gotten either with a much simpler code or by analytical techniques. In Sec. 2 a one dimensional equilibrium code is described and its results are checked against a two dimensional equilibrium code; in Sec. 3 an even simpler analytic calculation is presented. DOE

N83-32605# Princeton Univ., N. J. Lab. for Plasma Physics.
DIAGNOSTICS FOR NEUTRAL-BEAM-HEATED TOKAMAKS
Robert J. Goldston Dec. 1982 50 p refs
(Contract DE-AC02-76CH-03073)
(DE83-005049; PPPL-1951) Avail: NTIS HC A03/MF A01

Diagnostic techniques for neutral-beam-heated Tokamak plasmas fall into three categories: (1) magnetic diagnostics for measurements of gross stored energy, (2) profile diagnostics for measurements of stored thermal and beam energy, impurity content and plasma rotation, and (3) fast time resolution diagnostics to study MHD fluctuations and micro-turbulence. DOE

N83-32606# California Univ., Livermore. Lawrence Livermore Lab.
ZAPP: Z-PINCH ATOMIC PHYSICS PROGRAM
Kennedy Reed 7 Jan. 1983 27 p refs Presented at the 9th Conf. of the Natl. Soc. of Black Physicists Sci. Lectures, Baton Rouge, La., 29-30 Apr. 1982
(Contract W-7405-eng-48)
(DE83-005390; UCRL-87491; CONF-820496-1) Avail: NTIS HC A03/MF A01

High-density and high-temperature plasmas have been produced in a z-pinch with a hollow gas puff. A number of interesting atomic-physics phenomena occur in these plasmas and some of these phenomena provide important diagnostic information for characterizing the plasmas. Special attention was given to collisions of high-energy electrons with highly stripped ions in these plasmas. Such collisions may produce a population inversion which could result in stimulated emission in the X-ray regime. DOE

N83-32607# Illinois Univ., Urbana. Lab. for Fusion Studies.
BURN DYNAMIC EXPERIMENT BASED ON THE FIELD-REVERSED THETA PINCH
George H. Miley 1982 6 p refs Presented at the 5th Symp. on Phys. and Technol. of Compact Toroids in the Magnetic Fusion Energy Program, Bellevue, Wash., 16-18 Nov. 1982
(Contract DE-AC02-76ET-52040)
(DE83-005071; CONF-821124-13; COO-2218-262) Avail: NTIS HC A02/MF A01

A D-T burn dynamic experiment using a scaled-up field-reversed theta-pinch device is proposed as a first step towards demonstration of a D-3He burn. The feasibility of such an experiment is based on a loss-cone-like confinement scaling plus the use of combined pellet and neutral-beam injection to heat the plasma, build-up its density, and damp the m=2 instability. DOE

N83-32608# Los Alamos Scientific Lab., N. Mex.
THE ANTARES FACILITY FOR INERTIAL-FUSION EXPERIMENTS: STATUS AND PLANS
P. D. Goldstone, G. Allen, H. Jansen, A. Saxman, S. Singer, and M. Thuot 1982 13 p refs Presented at the 6th Intern. Workshop on Laser Interaction and Related Plasma Phenomena, Monterey, Calif., 25-29 Oct. 1982
(Contract W-7405-eng-36)
(DE83-003536; LA-UR-82-3328; CONF-821089-5) Avail: NTIS HC A02/MF A01

Antares is a large, 30 to 40 kJ CO2 laser system which will provide a base for experiments to determine the efficiency with which 10 micrometers of light can be used to drive target implosions while maintaining an acceptable level of preheat. Construction of the facility is in the final stages and diagnostics for initial experiments are being designed and constructed with operations scheduled to begin early in FY-84. After an initial shakedown period, a series of measurements will be performed to determine the energy scaling of hot electron temperature and target coupling efficiency in selected sets of targets including simple spheres. Experiments, now planned for Helios, will be continued to determine whether CO2-produced ions are appropriate for driving inertial fusion targets with acceptable efficiency (Helios experiments have demonstrated that as much as 40% of the incident light can be converted to fast ions). DOE

N83-32609# California Univ., Livermore. Lawrence Livermore Lab.
FUSION-POWER DEMONSTRATION
C. D. Henning, B. G. Logan, G. A. Carlson, W. S. Neef, R. W. Moir, R. B. Campbell (TRW), R. Botwin, I. R. Clarkson, and T. J. Carpenter 29 Mar. 1983 9 p refs Presented at the 5th Topical Meeting on Technol. of Fusion Energy, Knoxville, Tenn., 26-28 Apr. 1982 Prepared in cooperation with Grumman Aerospace, Bethpage, N.Y.
(Contract W-7405-eng-48)
(DE83-010370; UCRL-88224; CONF-830406-23) Avail: NTIS HC A02/MF A01

As a satellite to the MARS (Mirror Advanced Reactor Study) a smaller, near-term device has been scoped, called the FPD (Fusion Power Demonstration). Envisioned as the next logical step toward a power reactor, it would advance the mirror fusion program beyond MFTF-B and provide an intermediate step toward commercial fusion power. Breakeven net electric power capability would be the goal such that no net utility power would be required to sustain the operation. A phased implementation is envisioned, with a deuterium checkout first to verify the plasma systems before significant neutron activation has occurred. Major tritium-related facilities would be installed with the second phase to produce sufficient fusion power to supply the recirculating power to maintain the neutral beams, ECRH, magnets and other auxiliary equipment. DOE

N83-32610# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
RECENT ADVANCES IN THOMSON SCATTERING: HIGH REPETITION RATE THOMSON SCATTERING DIAGNOSTICS ON LARGE PLASMA DEVICES
K. Hirsch, H. Roehr (Max-Planck Inst. fuer Plasmaphysik, Garching, West Germany), H. Salzmann (Max-Planck Inst. fuer Plasmaphysik, Garching, West Germany), and K.-H. Steuer Sep. 1982 30 p refs Presented at 4th APS Topical Conf. on High Temp. Plasma Diagn., Boston, 25-27 Aug. 1982
(IPF-82-15) Avail: NTIS HC A03/MF A01

Periodically pulsed Thomson scattering which covers the whole duration of a tokamak discharge is described. Time resolution is 17 msec. Reliability is proved by operating for more than one year. The YAG laser pulses exceed 1 million single shots. Extension to a spatial multipoint system yields the evolution in time of temperature and density profiles. It is suggested that using a periodically pulsed Nd:YAG laser and silicon avalanche photodiodes fulfills the requirements of fusion devices. Author (ESA)

N83-32611# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
PROPOSAL FOR A NEW THOMSON SCATTERING TECHNIQUE FOR LARGE FUSION DEVICES
H. Salzmann and K. Hirsch Nov. 1982 35 p refs
(IPF-82-16) Avail: NTIS HC A03/MF A01

The application of 180 deg scattering using ultrashort laser pulses is proposed. Spatial resolution along the laser beam is achieved by high speed detection, allowing time of flight measurements. This LIDAR technique uses a minimum number of window ports, and makes remote control unnecessary. Measurements along a spatial chord of 2.5 m length with 27 spatial points (spatial resolution = 9 cm) can be performed. A statistical error of < 10 % can be achieved over the whole range of interesting plasma parameters. Only three optical components are placed in the torus hall. Only one wall penetration (of 80 sq cm) is needed. Laser repetition rates of at least 1 pulse/sec are possible. Author (ESA)

N83-32612# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
PROPOSED 60 GHz TRANSMISSION LINE SYSTEM FOR ELECTRON CYCLOTRON RADIATION HEATING (ECRH) ON W 7 ADVANCED STELLARATOR (AS)
G. Janaen, P. G. Schueller, and M. Thumm Dec. 1982 20 p refs
(IPF-82-17) Avail: NTIS HC A02/MF A01

The transmission line and launching systems for nonohmic plasma production and heating by ECR-waves with frequencies of 60 to 70 GHz for 200 kW, 100 msec and 800 kW, CW stellarators are described. The ECRH systems meet the requirements for neutral gas breakdown combined heating of a cold plasma and heating of a warm plasma. The TE02/TE01 gyrotron output mode mixture is converted into a pure TE01 mode which is used for long distance transmission in smooth overmoded waveguides. Waveguide tapers with nonlinear contours, circumferentially corrugated normal mode bends with nonlinear curvature, and mode selective directional couplers are used. A TE01-TE11 mode converter produces an almost linearly polarized RF field for improved irradiation. The ECR waves are launched by focusing mirrors and corrugated polarization twist reflectors. An optional hybrid HE11 mode system launches an axisymmetric, narrow centered quasioptical beam with nearly no cross polarization.
Author (ESA)

N83-32482# Tokyo Inst. of Tech. (Japan). Dept. of Energy Sciences.
NUMERICAL SIMULATIONS FOR INTENSE LIGHT-ION BEAM PROPAGATION IN CHANNEL UNDER INFLUENCE OF PLASMA INERTIA
Sigeo Kawata and Keishiro Niu *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 9-19 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32483# Tokyo Inst. of Tech. (Japan). Dept. of Energy Sciences.
PROPAGATION OF LIGHT ION BEAM MICRO- AND MACRO-STABILITIES OF ROTATING ION LAYER
Toshio Okada (Tokyo Univ. of Agriculture and Technology), Hiroyuki Murakami (Metropolitan Coll. of Technology), and Keishiro Niu *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 21-26 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N83-32613# British Library Lending Div., Boston Spa (England).
STRUCTURE OF MULTI-LAYER SPHERICAL CRYSTALS OF

GRAPHITE IN CAST IRON
V. V. Kurepina and A. V. Chernovol 1983 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 7, 1982 p 137-140
(BLL-M-35028-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

A careful investigation of the structure of graphite inclusions in an yttrium-inoculated hyper-eutectic cast iron was carried out. It was established that the outer zone of two-layer spheroidal inclusions is formed on account of group growth of individual graphite crystallites that were nucleated on the surface of the primary core. Indications were obtained on how the rarely-encountered three-layer inclusions might be formed. Author

N83-32614# California Inst. of Tech., Pasadena. Seismological Lab.
SHOCK COMPRESSION OF SINGLE-CRYSTAL FORSTERITE
J. Peter Watt and Thomas J. Ahrens [1983] 52 p refs
(Grant NSF EAR-80-18819)
Avail: NTIS HC A04/MF A01

Dynamic compression results are reported for single crystal forsterite shocked along the orthorhombic a and c axes to pressures between 130 and 165 GPa. Hugoniot states for both directions are well described by a single curve, but are displaced to densities 0.15 to 0.20 8/cubic cm lower than previous results for single crystal forsterite shocked along the b axis at pressures in excess of 100 GPa. Earlier data exhibit marginal evidence for similar b axis behavior in the mixed phase region from 50 to 92 GPa. Thus shock loaded forsterite is most compressible along the b axis in the mixed phase and high pressure regimes above 50 GPa. The present results represent the highest pressures at which shock properties were observed to depend on crystal orientation. Author

N83-32615# Dayton Univ., Ohio.
THE 4TH SYMPOSIUM ON APPLIED SURFACE ANALYSIS: PARTS 1 AND 2 Final Technical Report, 1 Feb. 1982 - 1 Feb. 1983
John T. Grant Mar. 1983 75 p refs Symp. held at Dayton, Ohio, 9-11 Jun. 1982
(Grant AF-AFOSR-0151-82; AF Proj. 2303)
(AD-A127109; UDR-TR-83-21; AFOSR-83-0216TR-Pt-1/2) Avail: NTIS HC A05/MF A01 CSCL 07/4

The 4th Symposium on Applied Surface Analysis was held at the University of Dayton, 9-11 June 1982. This Symposium was held to meet a need, namely to show the transition between basic surface science research and applications of this research in areas of Air Force interest. Areas receiving special attention at this Symposium were ion implantation, corrosion, catalysis, thin films, and electronic materials. Other topics discussed included adsorption, oxidation, coatings, cathodes, and developments in instrumentation. GRA

N83-32616# Amorphous Materials, Inc., Garland, Tex.
LARGE PLATE CdTe SYNTHESIS BY SEALED VESSEL TRANSPORT Quarterly Report, 1 Jan. - 31 Mar. 1983
A. R. Hilton Apr. 1983 43 p refs
(Contract MDA903-82-C-0159; ARPA Order 4384)
(AD-A127893; AMI-011; QR-5) Avail: NTIS HC A03/MF A01 CSCL 20/2

The fifth quarterly Technical Report for the program to grow large plates of high purity CdTe in a sealed system covers the period Jan. 1. - March 31, 1983. last quarter, difficulties in applying the three zone growth process to 8 diameter plates were described. The major difficulty was plugging of the filters between the chambers. This quarter, the problem was solved by changing the order in which the elements were transferred. The process was used to prepare large grain plates four times in a row. Optical evaluation indicates high purity material. Evaluation as a substrate material is underway in other laboratories. Next quarter, a 10 diameter plate will be prepared. Author (GRA)

N83-32617# Colorado State Univ., Fort Collins. Dept. of Physics.
STRUCTURE AND PHASE TRANSITIONS OF LIQUID CRYSTALS Final Report, 24 Sep. 1979 - 23 Sep. 1981
Noel A. Clark 27 Dec. 1982 9 p refs
(Contract DAAG29-79-C-0174)
(AD-A127573; ARO-16221.7-PH) Avail: NTIS HC A02/MF A01 CSCL 20/2

Results of experimental and theoretical investigations of the structure and dynamic behavior of liquid crystals are summarized. Work performed includes studies of: switching dynamics of ferroelectric liquid crystals; the structure and phase transitions of liquid crystals of disc-shaped molecules; and of defects and macroscopic elastic effects in lamellar liquid crystals.
Author (GRA)

N83-32618# General Electric Co., Schenectady, N. Y. Corporate Research and Development Dept.
FABRICATE INDIUM-ANTIMONIDE TWO-DIMENSIONAL CHARGE INJECTION DEVICE ARRAY Final Report
C.-Y. Wei and H. H. Woodbury Sep. 1982 29 p refs
(Contract N00173-80-C-0572)
(AD-A127638; REPT-83SRD024) Avail: NTIS HC A03/MF A01 CSCL 20/2

The objective of this program was to fabricate 16x64 two dimensional InSb CID arrays using the process sequence developed by GE CR&D under contract N00173-80-C-0281. This process sequences does not involve a thick-thin cut back of the pixel gate oxide and therefore produces an essentially planar structure. InSb CID focal plane arrays with 16x64 elements have been fabricated and various 2-D CID modes demonstrated on test structures incorporated on the chips. Low threshold voltages, low density of states in the interfaces and in the gate oxides and dual-gate coupling between row and column gates of less than one volt have led to the demonstration of practical ideal mode behavior. Author (GRA)

N83-32619# Ohio State Univ., Columbus. Center for Corrosion Studies.
THE DEVELOPMENT AND EVALUATION OF POINT DEFECT MODELS FOR THE GROWTH OF PASSIVE FILMS ON SINGLE CRYSTAL, POLYCRYSTALLINE, AND AMORPHOUS METAL SURFACES Annual Report, 1 Mar. 1982 - 28 Feb. 1983
Ru-Yu Liang, Kuan-Shaur Lei, B. G. Pound, and D. D. Macdonald 28 Feb. 1983 43 p refs
(Contract N00014-82-K-0265)
(AD-A128333; FCC-4445-2) Avail: NTIS HC A03/MF A01 CSCL 11/6

This research program was undertaken to provide data with which to test the validity of the point defect model developed by Macdonald and co-workers to describe the growth and breakdown of films on metals. The study is comprised of two tasks. Task 1 is an investigation of the growth of passive films on nickel and iron in phosphate solutions. Task 2 is concerned with the film breakdown behavior on single crystal and polycrystalline metals (Ni, Fe) and alloys (Fe-Ni, Fe-Ni-Cr) in borate buffer solutions with chloride present. Author (GRA)

N83-32620# Army Materials and Mechanics Research Center, Watertown, Mass. Materials Characterization Div.
THE MEASUREMENT OF X-RAY RESIDUAL STRESS IN TEXTURED CUBIC MATERIALS Final Report
Charles P. Gazzara Jan. 1983 22 p refs Presented at the Soc. for Experimental Stress Analysis Fall Meeting, Keystone, Colo., 13 Oct. 1981
(DA Proj. 1L1-61102-AH-42)
(AD-A127822; AMMRC-TR-83-3) Avail: NTIS HC A02/MF A01 CSCL 07/4

An X-ray diffraction procedure for measuring residual stress assumes a linear relationship between the d spacing and sin 2psi in isotropic materials. This study attempts to deal with the use of such a relationship in textured steel and aluminum using parallel beam optics. It was found that a phase difference occurs in the d

spacing and the X-ray intensity of the CrK alpha diffraction peak with psi resulting in errors in computing the residual stress. Possible contributing factors are considered, such as systematic errors, specimen preparation, absorption, grain size, and the optical system employed. Author (GRA)

N83-32621# Argonne National Lab., Ill.
FERMI-SURFACE PROPERTIES OF CeSn-3 AND RELATED COMPOUNDS
W. R. Johanson (Los Alamos Sci. Lab., N. Mex.), G. W. Crabtree, A. S. Edelstein (NRL, Washington, D.C.), and O. D. McMasters (Ames Lab., Iowa) 1982 24 p refs Presented at the IUPAP Intern. Conf. on Magnetism, Kyoto, 6 Sep. 1982
(Contract W-31-109-eng-38)
(DE83-008606; CONF-820929-12) Avail: NTIS HC A02/MF A01

The Fermi-surface properties of the coherent and incoherent forms of the dense Kondo and mixed-valence models for anomalous Ce compounds are examined. Experimental Fermi-surface data for CeSn3 and its isostructural, non-4f analog LaSn3 are presented and found to be consistent with either a coherent mixed valence or Kondon lattice interpretation. For CeSn3, one-electron band calculations of the Fermi surface geometry are in good agreement with experiment, but the calculated effective masses are too low. DOE

N83-32622# Argonne National Lab., Ill. Materials Science Div.
FORMATION ENERGY OF POINT DEFECTS IN FREE SURFACES AND GRAIN BOUNDARIES IN MgO
Dieter Wolf 1982 13 p refs Presented at the 4th Europhys. Topical Conf. on Lattice Defects in Ionic Crystals, Dublin, 30 Aug. 1982
(Contract W-31-109-eng-38)
(DE83-008524; CONF-820864-4) Avail: NTIS HC A02/MF A01

The computer code developed in recent years at Argonne National Laboratory for the investigation of the energy and structure of interfaces in ionic crystals has been extended to permit the consideration of neutral intrinsic point defects in such interfaces. As examples, bound Schottky pairs as well as substitutional Fe2+ and Ca2+ impurities are considered in the (100) surface and surface region. The role of isovalent impurities in the free (110) surface region and in a coincident-site twist boundary are also investigated. Results are compared and found in agreement with results obtained by means of the HADES program. DOE

N83-32623# Argonne National Lab., Ill. Materials Science and Technology Div.
OBSERVATION OF A FIRST-ORDER PHASE TRANSITION IN SINGLE-CRYSTAL ErRh-4B4 AT Hc-2
F. Behroozi (Wisconsin-Parkside Univ., Kenosha), G. W. Crabtree, S. A. Campbell (Sperry Univac, St. Paul), and D. G. Hinks 1982 14 p refs Presented at the IUPAP Intern. Conf on Magnetism, Kyoto, 6 Sep. 1982
(Contract W-31-109-eng-38)
(DE83-008609; CONF-820929-13) Avail: NTIS HC A02/MF A01

Detailed magnetization curves show a first-order phase transition in single-crystal ErRh4B4 at H/sub c2/ for the temperature range 3.3 K > or = T > or = 1.4K when the field is along the anti a axis. Below 3.3 K, the discontinuity in magnetization at H/sub c2 grows with decreasing temperature and moves to lower fields, eventually developing into the spontaneous moment in the ferromagnetic state. In the anti c direction the superconducting magnetization curves exhibit ordinary type-II behavior. DOE

N83-32624# SRI International Corp., Menlo Park, Calif.
IDENTIFICATION AND CLEAVAGE OF BREAKABLE SINGLE BONDS BY SELECTING OXIDATION, REDUCTION AND HYDROLYSIS Quarterly Report, 1 Jul. - 31 Oct. 1982
A. S. Hirschon, J. S. Zevely, and F. R. Mayo 14 Jan. 1983 25 p refs
(Contract DE-AC22-78ET-11423)
(DE83-005312; DOE/ET-11423/T6; QR-16) Avail: NTIS HC A02/MF A01

Efforts were made to establish the presence of diarylmethane groups in coal by oxidations of the corresponding ketones with m-chloroperbenzoic acid. No evidence of such groups was found. Black acids from a nitric acid oxidation of EDA/DMSO-extracted coal were examined for ketone groups, using the oxime and infrared absorption; no ketone or oxime was found. Reactions of a TIPS fraction with pyridine hydroiodide in pyridine, hydrogen iodide (HI) in toluene, and by aqueous hydrogen iodide were examined using molecular weight changes, vapor-phase osmometry (VPO), gel permeation chromatography (GLC), and iodine incorporation. Reactions with pyridine hydroiodide were complete and fairly consistent, with incorporation of about one iodine atom for each new molecule formed. Reactions in toluene and water were incomplete. DOE

N83-32625# Sandia Labs., Albuquerque, N. Mex.
LOCALIZATION OF SURFACE EXCITATIONS AND STIMULATED DESORPTION
D. R. Jennison and D. Emin 1982 13 p refs Presented at the 29th Natl. Symp. on Am. Vacuum Soc., Baltimore, 16 Nov. 1982
(Contract DE-AC04-76DP-00789)
(DE83-002143; SAND-82-2481C; CONF-821111-11) Avail: NTIS HC A02/MF A01

It is proposed that delocalized surface electronic excitations may localize by inducing lattice distortions, analogous to small polaron formation in bulk materials. It is argued that such localization is a necessary condition for desorption via electronic excitations. It is shown that multi-hole excitations in which the holes hop together move slowly and are coupled strongly to the lattice motion; as a result they rapidly localize. Moreover, single holes or exciton-like states may also localize depending upon the strength of the coupling to the atomic positions and the local life-time against hopping. A qualitative understanding of the phenomenon is provided and predictive methods explained, illustrated using the results of ab initio calculations on hydrogen: silicon. The low-lying eigenstates of an electronic excition of a deformable surface are studied within the adiabatic regime, where the electrons follow the atomic motions. DOE

N83-32626# Sandia Labs., Albuquerque, N. Mex.
FUNDAMENTAL MODELS OF ELECTRONIC TRANSPORT IN AMORPHOUS SEMICONDUCTORS
David Emin 1982 32 p refs Presented at the 2nd Intern. Otto Schott Colloq., Jena, West Germany, 12 Jul. 1982
(Contract DE-AC04-76DP-00789)
(DE83-000313; SAND-82-2216C; CONF-820743-2) Avail: NTIS HC A03/MF A01

Significant fundamental questions lie at the heart of our understanding of the electronic and optical properties of semiconducting and insulating glasses. In this article the principal features of the Mott-CFO model and the small polaron model are described. While the Mott-CFO model seems to apply to the high mobility electron transport in glassy SiO2 and Cd2As3 it does not appear applicable to the most frequently studied chalocogenide glasses. Furthermore, the Mott-CFO model does not account for as basic a feature as the sign of the Hall effect. On the other hand, the small polaron model accounts for the observed dc conductivity, Peltier heat and Hall mobility in a very simple and direct manner. DOE

N83-32627# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
CROSS-SECTIONAL TRANSMISSION ELECTRON MICROSCOPY OF SEMICONDUCTORS
D. K. Sadana Oct. 1982 14 p refs Presented at the 18th Univ. Ser. on Ceram. Sci. Advan. in Mater. Characterization, Alfred, N.Y., 16-18 Aug. 1982 Submitted for publication
(Contract DE-AC03-76SF-00098)
(DE83-003662; LBL-15085; CONF-820891-3) Avail: NTIS HC A02/MF A01

A method to prepare cross-sectional (X) semiconductor specimens for transmission electron microscopy (TEM) is described. The power and utility of XTEM was demonstrated. It was shown that accuracy and interpretation of indirect structural-defects

profiling techniques, namely, MeV He+ channeling and secondary ion mass spectrometry can be greatly enhanced by comparing their results with those obtained by XTEM from the same set of samples. DOE

N83-32628# Los Alamos Scientific Lab., N. Mex.
THIN FILMS FROM AMMONIA-BORANE
R. Liepins, B. Jorgensen, R. Jahn, R. A. Geanangel (Houston Univ.), and R. Komm (Houston Univ.) 1982 14 p refs Presented at 1st Intern. Conf. on Plasma Chem. and Technol., San Diego, Calif., 17 Nov. 1982
(Contract W-7405-eng-36)
(DE83-003567; LA-UR-82-3276; CONF-821147-1) Avail: NTIS HC A02/MF A01

A low pressure N2 plasma treatment of ammonia borane (H3NBH3) or its pyrolysis products ((H2NBH2)/sub n/, (HNBH)/sub n/) generates boron nitride compositions of empirical formula BNH. The process is conducted at essentially room temperature and involves the use of a stable commercially available starting material ammonia borane. DOE

N83-32629# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
FUNDAMENTAL LIMITS ON SQUID TECHNOLOGY
John Clarke Sep. 1982 39 p refs Presented at the NATO Adv. Study Inst. Conf. on Adv. in Superconductivity, Erica, Sicily, Italy, 3-15 Jul. 1982
(Contract DE-AC03-76SF-00098)
(DE83-002561; LBL-14972; CONF-820760-1) Avail: NTIS HC A03/MF A01

In the last few years, the flux noise energy of the dc Superconducting Quantum Interference Device (SQUID) was lowered by about four orders of magnitude. The most sensitive SQUID yet made is close to the limits set by fundamental quantum processes. The limiting quantum processes in both single junctions and SQUIDs was discussed. A very brief review of flux quantization and the Josephson effects which includes a discussion of the resistively shunted junction (RSJ) in the presence of thermal noise is presented. The theory of quantum noise in a single resistively shunted junction is outlined, and experiments to test the theory are described. A general overview of the properties and operation of the dc SQUID is given. This is followed by discussions of thermal and quantum noise, including both theory and experiment. The use of a SQUID as an amplifier is described, and the quantum noise limit is discussed. The importance of magnetic coupling is outlined. DOE

N83-32630# Brookhaven National Lab., Upton, N. Y.
THEORETICAL STUDIES OF POINT DEFECTS AND DIFFUSION IN Nb3Sn
D. O. Welch, G. J. Dienes, O. W. Lazareth, Jr., and R. D. Hatcher (Queens Coll., Flushing, N.Y.) 1982 4 p refs Presented at the Appl. Superconductivity Conf., Knoxville, Tenn., 30 Nov. 1982
(Contract DE-AC02-76CH-00016)
(DE83-005146; BNL-32274; CONF-821108-10) Avail: NTIS HC A02/MF A01

The structure and energetics of several simple point defects in A15 Nb3Sn were investigated by means of computer simulations based on a pair-potential model of cohesion. The properties of vacancies on both the Nb and Sn sublattices, as well as those of simple antisite defects, were examined, and estimates were made of the energetics of several types of atom-vacancy exchange (jump) processes. The results show an unusual structure for the vacancy on the Nb sublattice: the vacancy is split between two adjacent sites along the Nb chain with an atom midway between them. The Sn vacancy (on the Sn sublattice) was found to be metastable; this vacancy will decompose by an activated process into a more stable configuration consisting of a Nb atom on a Sn site adjacent to a split Nb-sublattice vacancy. DOE

N83-32631# Illinois Univ., Urbana. Dept. of Physics.
EFFECT OF PRESSURE ON THE RESISTIVITY AND HALL COEFFICIENT OF AMORPHOUS METALLIC ALLOYS Ph.D. Thesis
Laurie Elizabeth McNeil 1983 67 p refs
(Contract DE-AC02-76ER-01198)
(DE83-005399; DOE/ER-01198/1397) Avail: NTIS HC A04/MF A01

Measurements were made of the resistivity as a function of hydrostatic pressure in the range 0 to 5 kbar in the temperature interval 180 to 30 K for the amorphous alloys Fe80B20 (Metglas 2605), Fe19Ni61P14B6, Fe32Ni36Cr14P12B6 (Meglas 2826A), Pd82Si18, and Cu42Zr58. Measurements of the Hall coeffficient were also made in Fe19Ni61P14B6 and 2826A. The pressure coefficients of resistivity were uniformly negative and, with the exception of Fe80B20, insensitive to temperature. The contributions of thermal and magnetic scattering to the resistivity are negligible. The Ziman theory is found to be inadequate to account for the observed pressure dependence of the resistivity. DOE

N83-32632# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Materials Science.
HIGH-PURITY GERMANIUM CRYSTAL GROWING
W. L. Hansen and E. E. Haller Oct. 1982 17 p refs Presented at the 6th Intern. Symp. on the Sci. Basis for Radioactive Waste Management, Boston, 1-2 Nov. 1982
(Contract DE-AC03-76SF-00098)
(DE83-004181; LBL-14916; CONF-821107-39) Avail: NTIS HC A02/MF A01

The germanium crystals used for the fabrication of nuclear radiation detectors are required to have a purity and crystalline perfection which is unsurpassed by any other solid material. These crystals should not have a net electrically active impurity concentration greater than 10 to the 10th power 1/cubic cm. and be essentially free of charge trapping defects. Such perfect crystals of germanium can be grown only because of the highly favorable chemical and physical properties of this element. However, ten years of laboratory scale and commercial experience has still not made the production of such crystals routine. The origin and control of many impurities and electrically active defect complexes is now fairly well understood but regular production is often interrupted for long periods due to the difficulty of achieving the required high purity or to charge trapping in detectors made from crystals seemingly grown under the required conditions. DOE

N83-32633# California Univ., Berkeley. Lawrence Berkeley Lab.
THERMAL-GRADIENT MIGRATION OF BRINE INCLUSIONS IN SALT CRYSTALS Ph.D. Thesis
Suresh Kumar Yagnik Sep. 1982 135 p refs
(Contract DE-AC03-76SF-00098)
(DE83-004180; LBL-14752) Avail: NTIS HC A07/MF A01

High level nuclear waste disposal in a geologic repository was proposed. Natural salt deposits which are considered contain a small volume fraction of water in the form of brine inclusions distributed throughout the salt. Radioactive decay heating of the nuclear wastes will impose a temperature gradient on the surrounding salt which mobilizes the brine inclusions. Inclusions filled completely with brine migrate up the temperature gradient and eventually accumulate brine near the buried waste forms. The brine may slowly corrode or degrade the waste forms which is undesirable. In this work, thermal gradient migration of both all liquid and gas liquid inclusions was experimentally studied in synthetic single crystals of NaCl and KCl using a hot stage attachment to an optical microscope which was capable of imposing temperature gradients and axial compressive loads on the crystals. The migration velocities of the inclusion shape and size are discussed. DOE

N83-32634# Sandia Labs., Albuquerque, N. Mex.
Ga(As,P) STRAINED-LAYER SUPER-LATTICES: A TERNARY SEMICONDUCTOR WITH INDEPENDENTLY ADJUSTABLE BAND GAP AND LATTICE CONSTANT
P. L. Gourley and R. M. Biefeld 1982 15 p refs Presented at the Intern. Conf. on Metastable and Modulated Semiconductor Structures, Pasadena, Calif., 6 Dec. 1982
(Contract DE-AC04-76DP-00789)

(DE83-003917; SAND-82-1874C; CONF-821219-2) Avail: NTIS HC A02/MF A01

We have measured both the lattice constant and the optical transitions in GaP/GaAs/sub x/P/sub 1-x/ strained-layer superlattices (SLSs) as a function of composition x from x = 0 to 0.6. By comparing these results to those for the alloys GaAs/sub anti x/P/ sub 1-anti x/ where anti x = x/2 corresponds to the same average compositions as the SLSs, we demonstrate for the first time in a ternary system, a semiconductor crystal with a bandgap that can be varied independently of its lattice constant. DOE

N83-32635# Ames Lab., Iowa.
THE CRYSTAL AND MOLECULAR STRUCTURES OF SELECTED RUTHENIUM (II) PHOSPHATE COMPLEXES AND VINYL BROMIDE-BENZOTHIOPHENE ADDUCTS M.S. Thesis
Dale Earl Hauenstein Dec. 1982 91 p refs
(Contract W-7405-eng-82)
(DE83-004788; IS-T-1032) Avail: NTIS HC A05/MF A01

The crystal and molecular structures of two separate isomers for formula BrCl2SC10H7 from a photochemical cycloaddition reaction of three dimensional, single crystal X-ray analysis and successive structure factor and electron density map calculations. Both isomers of BrCl2SC10H7 (Product 1) crystallize in the monoclinic space group. The molecules are fused benzo(b) thiophenocyclobutane isomers, consisting of a slightly puckered trisubstituted cyclobutane ring. The appropriate name for each isomer is 1-bromo-2,3-(2,3dichlorobnzo[b]thiopheno)cyclobutane where the bromine atom is either trans (Product 1) or cis(Product 2) with respect to the chlorine positions. Bond angles and bond lengths were calculated for both isomers. DOE

N83-32636# Brookhaven National Lab., Upton, N. Y.
DATA PROCESSING IN NEUTRON PROTEIN CRYSTALLOGRAPHY USING POSITRON-SENSITIVE DETECTORS
B. P. Schoenborn 1982 11 p refs Presented at Workshop on Position-Sensitive Detection of Thermal Neutrons, Grenoble, France, 11 Oct. 1982
(Contract DE-AC02-76CH-00016)
(DE83-005803; BNL-32430) Avail: NTIS HC A02/MF A01

Neutrons provide a unique probe for localizing hydrogen atoms and for distinguishing hydrogen from deuterons. Hydrogen atoms largely determine the three dimensional structure of proteins and are responsible for many catalytic reactions. The study of hydrogen bonding and hydrogen exchange will therefore give insight into reaction mechanisms and conformational fluctuations. In addition, neutrons provide the ability to distinguish N from C and O and to allow correct orientation of groups such as histidine and glutamine. To take advantage of these unique features of neutron crystallography, one needs accurate Fourier maps depicting atomic structure to a high precision. Special attention is given to subtraction of the high background associated with hydrogen containing molecules, which produces a disproportionately large statistical error. DOE

N83-32637# Los Alamos Scientific Lab., N. Mex. Theoretical Div.
CURRENT ANALYSIS FOR ROTATING AND VIBRATING HEAVY NUCLEI
Jutta Kunz, Andreas Schuh (Washington Univ., Seattle), Ulrich Mosel (Geissen Univ., West Germany), and Eberhard Wuest (Geissen Univ., West Germany) 1982 14 p refs Presented at the Topical Meeting on Nucl. Fluid Dyn. ICTP, Trieste, Italy, 11-15 Oct. 1982
(Contract W-7405-eng-36)
(DE83-000612; LA-UR-82-2821; CONF-821065-1) Avail: NTIS HC A02/MF A01

Microscopic current distributions are calculated for rotations and quadrupole vibrations of heavy nuclei in the cranking model using the Nilsson Hamiltonian and pairing correlations. The currents are analyzed in terms of vector spherical harmonics; symmetry relations are taken into account. In the case of collective rotations magnetic and electric current contributions occur. The two dominant contributions correspond to rigid and irrotational flow. The strong influence of pairing on the rotational currents is demonstrated. It can be understood by investigating the delta N = 0 and delta N = 2 contributions to the currents. For collective quadrupole vibrations only electric current contributions occur. In contrast to the irrotational Bohr-Tassie flow the realistic current fields show a vortex structure. DOE

N83-32638# Brookhaven National Lab., Upton, N. Y. Physics Dept.
WHY QCD LATTICE THEORY IS IMPORTANT TO SPIN PHYSICISTS
Claudio Rebbi 1982 6 p refs Presented at the 5th Intern. Symp. on High Energy Spin Phys., Upton, N.Y., 16-22 Sep. 1982
(Contract DE-AC02-76CH-00016)
(DE83-003955; BNL-32230; CONF-820941-10) Avail: NTIS HC A02/MF A01

The lattice formulation of a quantum field theory allows calculations in the regime of strong coupling, by expansion techniques, and for intermediate coupling, by Monte Carlo simulations. These computations are especially valuable in the case of Quantum Chromodynamics, where several of the most important problems are not amenable to a perturbative analysis. Monte Carlo simulations, in particular, have recently emerged as a very powerful tool and have been used to evaluate a variety of important physical quantities, such as the string tension, the deconfinement temperature, the scale of the interquark potential, glueball masses and masses in the quark model spectrum. DOE

N83-32639# Brookhaven National Lab., Upton, N. Y. Physics Dept.
LATTICE GUAGE THEORIES
Claudio Rebbi 1982 19 p refs Presented at the 21 Intern. Conf. on High Energy Phys., Paris, 26-31 Jul. 1982
(Contract DE-AC02-76CH-00016)
(DE83-002827; BNL-32143; CONF-820718-22) Avail: NTIS HC A02/MF A01

Recent research on lattice gauge theories is reviewed. Particular emphasis is placed on numerical results from Monte Carlo simulations. DOE

N83-32640# Sandia Labs., Albuquerque, N. Mex.
DOPING AND TRANSPORT STUDIES IN In/SUB x/Ga/SUB 1-x/As/GaAs STRAINED-LAYER SUPERLATTICES
I. J. Fritz, L. R. Dawson, and T. E. Zipperian 1982 15 p refs Presented at Intern. Conf. on Metastable and Modulated Semiconductor Structures, Pasadena, Calif., 6 Dec. 1982
(Contract DE-AC04-76DP-00789)
(DE83-003915; SAND-82-1847C; CONF-821219) Avail: NTIS HC A02/MF A01

High quality In/sub x/Ga/sub 1-x/As/GaAs strained layer superlattices (SLS's), with 0.11 = to or < x = to or < 0.20, were grown by molecular beam epitaxy. The test structures grown include the first doped material in this SLS system, with Si being used for n-type doping and Be for p-type. A number of structures with up to 80 superlattice periods and with layer thicknesses in the 40 to 140 A range were characterized by X-ray diffraction and optical techniques. Doped specimens were characterized by C-V profiling and, for diode structures, by I-V, four terminal resistivity, and Hall effect measurements. Hall mobilities (parallel to the layers) are comparable to those of high quality bulk alloy material, further evidence of the high crystalline quality possible in multilayer structures with thin, high mismatched (> 1%) layers. DOE

N83-32641# Sandia Labs., Albuquerque, N. Mex.
SIMPLE THEORY FOR MAXIMUM H INVENTORY AND RELEASE: A NEW TRANSPORT PARAMETER
B. L. Doyle 1982 28 p refs Presented at the 5th Intern. Conf. on Plasma Surface, Gatlinburg, Tenn., 3 May 1982
(Contract DE-AC04-76DP-00789)
(DE82-014076; SAND-82-0241C; CONF-820545-3) Avail: NTIS HC A03/MF A01

A simplified theory of hydrogen transport in materials is presented. The problem is formulated in terms of a dimensionless transport parameter, W = R radical/phiK/sub 0//D where R is

the projected range, phi is the incident penetrating flux, K/sub 0/ is a phenomenological recombination coefficient and D is the diffusion coefficient for hydrogen in the material. Using this parameter, equations which describe recycle times, maximum hydrogen inventory and maximum hydrogen permeation are derived. This treatment yields simple analytic expressions for these quantities that are shown to be excellent approximations to the behavior obtained from exact numerical solutions. This transport parameter further results in a natural classification of the different types of behavior of hydrogen in materials. Author

N83-32642# State Univ. of New York, Stony Brook. Dept. of Materials Science and Engineering.
X-RAY TOPOGRAPHIC FRACTOGRAPHY OF SINGLE CRYSTALS OF MOLYBDENUM AND NIOBIUM M.S. Thesis
Anthony Blane Hmelo Dec. 1982 150 p refs
(Contract DE-AC02-80ER-10740)
(DE83-005066; DOE/ER-10740/8) Avail: NTIS HC A07/MF A01

The semibrittle (001) cleavage fracture at 77 K of Mo and outgassed Nb single crystals was related to their fracture toughness. Berg-Barrett X-ray reflection topography and White Beam Synchrotron Fractography were used. Calibrated electropolishing in layers followed by Synchrotron Fractography revealed that under the conditions which existed at the tip of the running crack, Mo underwent general yielding which resulted in a plastically curved lattice. This result correlates with the substantial fracture toughness for Mo measured previously. On the other hand, double (112) slip was observed for Nb. The plastic zone associated with the crack tip is shown to have a structure typical of shock loaded materials, consisting of arrays of screw dislocations, micro- and macrotwins. This result correlates with the low fracture toughness of Nb at 77 K. It is proposed that these extremes in cleavage behavior for Mo vs Nb are rationalized in terms of the capacity of a bcc structure to undergo a slip to twinning transition at high strain rates. DOE

N83-32643# Ames Lab., Iowa.
ELECTRONIC STRUCTURE OF HCP LUTETIUM M.S. Thesis
Timothy Alan Tibbetts Dec. 1982 78 p refs
(Contract W-7405-eng-82)
(DE83-004866; IS-T-1027) Avail: NTIS HC A05/MF A01

The electronic structure of hcp lutetium was calculated by means of the Linearized Augmented Plane Wave-including Spin-Orbit coupling band structure method, providing a fully relativistic self-consistent prototypical paramagnetic heavy rare earth Fermi surface. The calculated band structure, density of states, Fermi surface, susceptibility, and magnetic form factor are presented and compared with the results of dHvA, specific heat, susceptibility, and induced neutron magnetic form factor experiments. Good agreement is found between experiment and theory, although instability of the 4f-band position remains a problem. Additionally, is it felt that improvements in the exchange-correlation potential and in the Muffin-Tin potential approximation will improve the convergence of the method and the quality of the results. DOE

N83-32644# Philips Zentrallaboratorium G.m.b.H., Hamburg (West Germany). Forschungsabt. Informationssysteme.
INFLUENCE OF ION RADIATION ON THE MAGNETIC PROPERTIES OF FERRIMAGNETIC FILMS Final Report, Jan. 1982
Peter Hansen, Heinrich Heitmann, Bernhard Strocka, and Reimar Spohr (Gesellschaft fuer Schwerionenforschung) Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 180 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-048; ISSN-0340-7608) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 34,50

A technique for influencing the material properties and for structuring magneto-optic garnet films by irradiation with heavy ions of high energy is described. The dependence of lattice constant, magnetization, hyperfine field, anisotropy, Faraday rotation, optical absorption, and linewidth of ferrimagnetic garnet films on the irradiation conditions (energy, mass, dosage) is presented. The etching and annealing behavior of the nuclear tracks induced by the heavy-ion irradiation is reported. Author (ESA)

N83-31642# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Space Simulation.
PARTICLE TRANSPORT INDUCED BY DIRECTIONAL SOLIDIFICATION
H. Klein and R. Naehle *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 37-40 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31649# Ceskoslovenska Akademie Ved, Prague. Inst. of Physics.
ON THE NUCLEATION OF MELTS UNDER MICROGRAVITY CONDITIONS
C. Barta, A. Triska, V. Ilyukhin (Academy of Sciences, Moscow), and G. Zhukov (Academy of Sciences, Moscow) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 79-83 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31655# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
AN AUTOMATIC MONOELLIPSOIDAL MIRROR FURNACE FACILITY FOR LONG-TERM CRYSTAL GROWTH ON THE EUROPEAN RETRIEVABLE CARRIER (EURECA)
J. Stapelmann *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 117-119 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31660# Genoa Univ. (Italy). Ist. di Mineralogia.
RECONSTRUCTION BY MULTIDIRECTIONAL HOLOGRAPHIC INTERFEROMETRY OF THE CONCENTRATION FIELD IN A SUPERSATURATED SOLUTION NEAR A GROWING NaClO3 CRYSTAL
F. Bedarida, L. Zefiro, P. Boccacci (ESA, Paris), and C. Pontiggia *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 139-143 refs Sponsored by CNR and ESA (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31664# Rockwell International Corp., Thousand Oaks, Calif.
LDEF EXPERIMENTS: CRYSTAL GROWTH BY A SOLUTE DIFFUSION PROCESS
M. D. Lind and K. F. Nielsen (Technical Univ. of Denmark, Lyngby) *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 167-174 refs Sponsored by Space Flight Corporation of Denmark Ltd. (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31683# Commissariat a l'Energie Atomique, Grenoble (France).
ORDER OF MAGNITUDE ANALYSIS OF SOLUTE MACROSEGREGATION IN CRYSTAL GROWTH FROM THE MELT
J. J. Favier and D. Camel *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 295-299 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31688# Academy of Sciences (USSR), Moscow. Baikov Inst. of Metallurgy.
EXPERIMENTS ON CRYSTALLIZATION OF SEMICONDUCTORS ABOARD SALYUT 6: SOYUZ ORBITAL COMPLEX
V. S. Zemskov, M. R. Raukhaman, and I. N. Belokurova *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 325-329 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31689# Technische Hochschule, Aachen (West Germany).
SOLIDIFICATION FRONT DYNAMICS IN MODEL SYSTEMS

A. Ecker and P. R. Sahm *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 331-336 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31702# Academy of Sciences (USSR), Moscow. Inst. for Space Research.
PERIODIC CRYSTALLIZATION OF BINARY MELTS UNDER DIFFUSION CONTROLLED MASS TRANSFER
L. L. Regel and Nguyen Thanh Nghi *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 421-427 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-31703# Academy of Sciences (USSR), Moscow. Inst. for Space Research.
DIRECTIONAL CRYSTALLIZATION OF Pb Te UNDER MICROGRAVITY CONDITIONS
L. L. Regel, Nguyen Thanh Nghi, and O. I. Rachmatov *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 429-433 refs (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

N83-32084# Technical Univ. of Istanbul (Turkey).
DYNAMIC APPLICATIONS OF PIEZOELECTRIC CRYSTALS. PART 2: THEORETICAL STUDIES
M. C. Doekmeci *In* Shock and Vibration Information Center The Shock and Vibration Digest, v. 14, no. 4 Apr. 1983 p 15-26 refs (For primary document see N83-32082 20-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/2

N83-32499# Hitachi Ltd., Tokyo (Japan). Central Research Lab.
RECENT DEVELOPMENTS IN THE INVESTIGATIONS ON THE GAS-SURFACE INTERACTIONS
Tetsuo Fujimoto (Mie Univ.), Shigehiko Yamamoto, and Seizo Kato (Mie Univ.) *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 187-189 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

N83-32502# Miyazaki Univ. (Japan). Dept. of Applied Physics.
REMARKS ON THERMAL PROPERTIES OF ROTATING SUPERFLUID HELIUM IN A GRAVITATIONAL FIELD
Kanji Etori *In* Inst. of Space and Astronautical Sci. Proc. of the Symp. on Mech. for Space Flight Mar. 1983 p 211-228 refs (For primary document see N83-32480 20-70)
Avail: NTIS HC A13/MF A01

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N83-32645# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
THERMODYNAMIC PROPERTIES OF STRONGLY NONIDEAL FLUID MIXTURES FROM AN XTENDED QUASI-CHEMICAL THEORY
D. Dimitrelis and J. M. Prausnitz Nov. 1982 25 p refs Presented at the Ann. Meeting of the American Inst. of Chemical Engineers, Los Angeles, 14-19 Nov. 1982
(Contract DE-AC03-76SF-00098)
(DE83-004295; LBL-15156; CONF-821106-21) Avail: NTIS HC A02/MF A01

In his later years, E. A. Guggenheim recognized that the exchange energy in his quasi-chemical theory of mixtures is really a free energy. Proper use of quasi-chemical theory contains an entropic contribution which must also be considered in calculating deviations from random mixing. Methods for including this entropic contribution are discussed here. When Guggenheim's quasi-chemical theory is coupled with a two fluid theory of mixtures and a suitable reference system, we obtain an equation of state that may be particularly useful for fluid mixtures showing large deviations from ideality. DOE

N83-31662# Technische Hochschule, Aachen (West Germany). Inst. fuer Physikalische Chemie.
THERMODYNAMICS OF IRREVERSIBLE PROCESSES IN MOLTEN SALTS: PROBLEMS OF INTERDIFFUSION MEASUREMENTS UNDER MICROGRAVITY
J. Richter and A. Hahne *In* ESA Mater. Sci. under Microgravity Jun. 1983 p 153-160 refs Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn (For primary document see N83-31637 20-12)
Avail: NTIS HC A19/MF A01; ESA, Paris FF 140

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N83-32646# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
WOMEN AT SEA: WELCOME ABOARD M.S. Thesis
Joyce A. Sherrod Mar. 1983 141 p refs
(AD-A128602) Avail: NTIS HC A07/MF A01 CSCL 05/9

Industrial psychologists claim that social acceptance and integration of new personnel on the job is of major importance in the work environment. During fiscal year 1978, 53 female naval officers stepped out of traditional roles and on board a total of 14 ships. This event broke decades of tradition against navy women being permitted aboard line ships. Currently, there are 187 female officers on board a total of 30 ships. This study attempts to discover what actions the commands took in fiscal year 78 to enhance the integration of the first shipboard women officers five years ago and what the women did or experienced that facilitated their integration. This data is compared to the current social integration data. Additionally, this study addresses the issue of what exhibited behaviors were considered acceptable by the shipboard commands for female officers and to what extent these behaviors could be considered typically masculine, typically feminine or androgynous. GRA

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N83-32647# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SCIENCE AND TECHNOLOGY POLICY, NO. 9
24 Jan. 1983 76 p refs Transl. into ENGLISH from various Russian articles
(JPRS-82713) Avail: NTIS HC A05

Various aspects of scientific and technical progress in the USSR are discussed. Specifically methods for accelerating adoption of scientific achievements methods for nondestructive quality control, information processing and the economic aspects of scientific research are considered. For individual titles, see N83-32648 through N83-32654.

N83-32648# Joint Publications Research Service, Arlington, Va.
METHODS DISCUSSED FOR ACCELERATING ADOPTION OF SCIENTIFIC ACHIEVEMENTS
V. Oligin-Nesterov *In its* USSR Rept.: Sci. and Technol. Policy No. 9 (JPRS-82713) 24 Jan. 1983 p 11-15 refs Transl. into ENGLISH from Ekon. Nauki (USSR), no. 7, Jul. 1982 p 105-107 (For primary document see N83-32647 20-81)

Avail: NTIS HC A05

The question of who should compensate for the expenses to adopt the results of scientific research in production is discussed. Various ways of solving this problem are being tried, concluding an economic agreement with industrial enterprises or a creative cooperation agreement between scientists and production workers that specifies that work be done to adopt scientific achievements, etc. The primary deficiency in such solutions to the problem is the lack of a firm foundation that makes it possible to regulate and, chiefly, to accelerate the process of adoption according to a planned procedure. Difficulties also arise during adoption of the results of scientific developments in production by the understandable attempt of enterprises to, first of all, complete the principal planned tasks, by the collectives' uncertainty of whether the expected results of NTP (scientific and technical progress) are attainable in practice and most often by a lack of the funds required. B.W.

N83-32649# Joint Publications Research Service, Arlington, Va.
BETTER RESULTS FROM DEVELOPMENT OF TECHNICAL EQUIPMENT
I. Prodius *In its* USSR Rept.: Sci. and Technol. Policy No. 9 (JPRS-82713) 24 Jan. 1983 p 16-25 ref Transl. into ENGLISH from Ekon. Sov. Ukrainy (USSR), no. 7, Jul. 1982 p 43-48 (For primary document see N83-32647 20-81)
Avail: NTIS HC A05

Branch scientific research institutes and design bureaus are important units which solve problems related to direct integration of science and production. The most important indicators of the results of the labor of workers in scientific research institutes and design bureaus, are the following: (1) the development of the most effective directions for scientific and technical progress in the branch; (2) reduction of the duration of the cycle research production; (3) the number of introduced developments and their actual economic effect; and (4) improvement of the quality of developments and the quality of the labor of the developers. An analysis of the experimental base of the scientific research institutes and design bureaus showed that in a considerable majority of the design organizations the experimental and testing industries are small and do not satisfy the needs of the designers and developers. As a result, a considerable proportion of the design and technological developments require finishing during the process of their industrial introduction. Measures taken to strengthen the experimental base of branch scientific research institutes and design bureaus are discussed. B.W.

N83-32650# Joint Publications Research Service, Arlington, Va.
RESULTS OF COMPREHENSIVE PROGRAMS SUMMARIZED
D. Zhimerin *In its* USSR Rept.: Sci. and Technol. Policy No. 9 (JPRS-82713) 24 Jan. 1983 p 27-30 Transl. into ENGLISH from Sots. Industriya (USSR), 13 Aug. 1982 p 2 (For primary document see N83-32647 20-81)
Avail: NTIS HC A05

The results of 170 comprehensive programs which were developed by the USSR State Committee on Science and Technology, by the Union-level Gosplan, and the USSR Academy of Sciences are summarized. In summing up results, it can be said that in the recent past much has been done in the designing and introduction of new equipment and technology. At the same time it is essential to note that in the past year the targets of the comprehensive programs were only fulfilled by 96 percent. In some cases deadlines were not met only because ministries such as the union Ministry of the Coal Industry, the Ministry of Non-Ferrous Metallurgy, the Ministry of Power Machine Building, the Ministry of Agricultural Machine Building, the Ministry of the Petroleum Refining and Petrochemical Industries, as well as certain construction ministries, have not brought the program targets to those who must fulfill them in time; nor have they adopted the necessary measures to fulfill them. B.W.

N83-32651# Joint Publications Research Service, Arlington, Va.
NONDESTRUCTIVE QUALITY CONTROL DISCUSSED **c38**
M. Mikheyev *In its* USSR Rept.: Sci. and Technol. Policy No. 9 (JPRS-82713) 24 Jan. 1983 p 31-33 Transl. into ENGLISH from Pravda (USSR), 22 Aug. 1982 p 3 (For primary document see N83-32647 20-81)
Avail: NTIS HC A05

The use of nondestructive methods of quality control is discussed. It is especially effective on all types of transportation: railway, air and underground forms of transportation, etc. In the USSR successful use is being made of magnetic and ultrasound railway car defectoscopes, which move at a speed of up to 70 kilometers per hour. They make it possible to check the quality of the rails of all the railroads in the country several times a year. Evidence is provided of the level of development and application of nondestructive methods of quality control in the Soviet Union. And there is further evidence of this in the decision to hold the next international conference in the USSR. B.W.

N83-32652# Joint Publications Research Service, Arlington, Va.
USES OF INFORMATION DISCUSSED **c82**
A. Zhuravlev *In its* USSR Rept.: Sci. and Technol. Policy No. 9 (JPRS-82713) 24 Jan. 1983 p 34-37 Transl. into ENGLISH from Sov. Beloruss. (USSR), 5 Oct. 1982 p 2 (For primary document see N83-32647 20-81)
Avail: NTIS HC A05

Innovations and obstacles involved in disseminating scientific and technical information in the USSR are discussed. The volume, production and labor are considered. B.W.

N83-32653# Joint Publications Research Service, Arlington, Va.
STREAMLINING FLOW OF SCIENTIFIC AND TECHNICAL INFORMATION **c82**
T. Borovikova *In its* USSR Rept.: Sci. and Technol. Policy No. 9 (JPRS-82713) 24 Jan. 1983 p 38-39 Transl. into ENGLISH from Turkmenskaya Iskra (USSR), 20 Oct. 1982 p 4 (For primary document see N83-32647 20-81)
Avail: NTIS HC A05

Methods of streamlining flow of scientific and technical information are presented. Information in areas such as energy conservation, and agriculture are considered. B.W.

N83-32654# Joint Publications Research Service, Arlington, Va.
R&D ACTIVITIES OF BELORUSSIAN SSR ACADEMY OF SCIENCES DESCRIBED
V. P. Gribkovskiy *In its* USSR Rept.: Sci. and Technol. Policy No. 9 (JPRS-82713) 24 Jan. 1983 p 42-44 Transl. into ENGLISH from Sov. Beloruss. (USSR), 1 Sep. 1982 p 2 (For primary document see N83-32647 20-81)
Avail: NTIS HC A05

Scientific and technical progress in the USSR is advancing in giant strides. A major reason for its achievements is the cooperation of the nations, the Leninist nationality party - the cooperation between countries is discussed in detail. Results of this cooperation are also cited. B.W.

N83-32655# Comptroller General of the United States, Washington, D.C.
BETTER USE OF INFORMATION TECHNOLOGY CAN REDUCE THE BURDEN OF FEDERAL PAPERWORK
General Accounting Office 11 Apr. 1983 49 p refs
(GAO/GGD-83-39; B-210393) Avail: NTIS HC A03/MF A01

Four data collection activities were reviewed as case studies to determine the potential benefits associated with information technology. In addition, GAO assessed OMB's policies and procedures in this area. GAO found that increased use of information technology would reduce Federal paperwork burden and improve the efficiency of the data collection activities reviewed. Author

N83-32656# Comptroller General of the United States, Washington, D.C.
IMPLEMENTING THE PAPERWORK REDUCTION ACT: SOME PROGRESS, BUT MANY PROBLEMS REMAIN
General Accounting Office 20 Apr. 1983 69 p refs
(GAO/GGD-83-35; B-180224) Avail: NTIS HC A04/MF A01

Paperwork burden reduction, policy and management decisions, and limited progress are discussed. Author

N83-32657*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
RESEARCH IN SPACE COMMERCIALIZATION, TECHNOLOGY TRANSFER, AND COMMUNICATIONS, VOLUME 2 Final Report, 1 Jul. 1978 - 30 Jun. 1983
Donald A. Dunn and Carson E. Agnew 30 Jun. 1983 634 p refs
(Contract NASw-3204)
(NASA-CR-172955; NAS 1.26:172955) Avail: NTIS HC A99/MF A01 CSCL 05A

Spectrum management, models for evaluating communication systems, the communications regulatory environment, expert prediction and consensus, remote sensing, and manned space operations research are discussed. Author

N83-32658# Naval Postgraduate School, Monterey, Calif.
PROBLEMS ASSOCIATED WITH THE IMPLEMENTATION OF MANAGEMENT CONTROL SYSTEMS M.S. Thesis
James Maxson Bell Dec. 1982 89 p refs
(AD-A127254) Avail: NTIS HC A05/MF A01 CSCL 05/1

The objective of the study is to determine if the Navy is following sound implementation procedures when a new system is introduced into the organization. Case studies are employed to determine what problems occur in a specific implementation process and whether the problems which did appear could have been avoided by an improved implementation process. This objective is accomplished through a comparison of theoretical models of change and implementation procedures found in accounting and related literature to the actual implementation procedures employed by the Navy in the case studies. The conclusion of the thesis, although the sample size was limited, is that the Navy does have a sound process for implementing change in its management control systems and that the implementation process is used. Author (GRA)

N83-32659# Leadership and Management Development Center, Maxwell AFB, Ala.
MANAGEMENT'S ROLE FOR REDUCING EMPLOYEE STRESS Final Report
Clifford M. Purington, Jr. Mar. 1983 38 p refs
(AD-A127126; LMDC-TR-83-1) Avail: NTIS HC A03/MF A01 CSCL 05/1

This literature review on job related stress is based on several sets of findings from behavioral and medical research. Support is offered for the premise that job related factors are a primary cause of stress induced illness among people in today's work force. Whether or not a job actually provokes stress depends a great deal on how a person perceives the situation. This perception in turn is influenced by a variety of individual differences in people and by differences in the work environment. Medical researchers now believe that the chemical stress reaction within the human body is the most important causative factor in contemporary health breakdowns. The economic costs of stress in terms of health care in 1980 was on in every 14 dollars. Management is now realizing the related personnel costs associated with absenteeism, turnover, premature retirement, serious illness, alcoholism, and death will become an even bigger problem in the future. Authors generally agree that the responsibility for reducing employee stress belongs to management. However, since there is no single cause or effect of stress, a simple solution to correct the problem does not exist. Therefore, a combination of approaches need to be established to help people and organizations deal effectively with stress in the work force. The review concludes with some discussion and recommendations to management for helping employees cope productively with job related stress. GRA

N83-32660# Naval Postgraduate School, Monterey, Calif.
ORGANIZATIONAL STRUCTURE CONSIDERATIONS FOR SOFTWARE DEVELOPMENT PROJECTS M.S. Thesis
Kevin M. Quinn Dec. 1982 46 p refs
(AD-A127061) Avail: NTIS HC A03/MF A01 CSCL 05/1

Organizational structure has long been recognized as having an important impact on an organization's ability to accomplish its objectives. This paper provides managers of software development projects with an analysis of the importance of several elements of organizational structure, and of how they can use this knowledge to make decisions which will have a positive impact on the success of their projects. The structural elements discussed are specialization of activities, size of the work group, and standardization of activities. Author (GRA)

N83-32661# Systems Technology Lab., Inc., Arlington, Va.
POST ACCIDENT PROCEDURES FOR CHEMICALS AND PROPELLANTS Final Interim Report, 11 Aug. 1980 - 31 Mar. 1981
Deborah K. Shaver, Erskin E. Harton, Jr., Robert L. Berkowitz, and T. James Rudd Edwards AFB, Calif. Air Force Rocket Propulsion Lab. Sep. 1982 404 p refs
(Contract F04611-80-C-0046)
(AD-A127505; AFRPL-TR-82-031) Avail: NTIS HC A18/MF A01 CSCL 05/1

This report presents production volumes, storage capacities, shipment quantities, containers used for highway and rail shipments, general commodity flow patterns and disposal sites and capabilities for 12 hazardous materials; an overview of emergency response guidelines and resources available to selected industry groups and state and local agencies; a review of the CHRIS, EPA, AAR, and DOT emergency response systems as they specifically apply to the 12 hazardous materials; a review of 16 NTSB investigated rail and highway accidents involving these hazardous materials; a discussion of six spill scenarios, the philosophy behind their development and their applicability to community planning; a discussion of the USCG HACS, Shell R&D Spills, AF statistical/empirical, DDESB Chemical Hazard Slide Rule and an overview of dense gas vapor dispersion models, the assumptions basic to each and their applicability to transportation spills; criteria which are needed for developing improved and innovative guidelines to mitigate hazards associated with response activities at hazardous materials transportation accidents; and a discussion of state-of-the-art means for physically lifting derailed cars and containers. Author (GRA)

N83-32662# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Directorate of Equipment Engineering.
BUILDING AND OPERATING THE LOGISTICS COMPOSITE MODEL (LCM) FOR NEW WEAPON SYSTEMS, PART A Final Report, Nov. 1981 - Jul. 1982
Eugene R. Richards, Jr. Feb. 1983 120 p refs Supersedes AFHRL-TR-74-97(2)
(AF Proj. AFSD)
(AD-A127538; ASD-TR-82-5033; AFHRL-TR-74-97(2)) Avail: NTIS HC A06/MF A01 CSCL 05/9

The purpose of this documentation is to update AFHRL-TR-74-97 (II), Simulating Maintenance Manning for Weapon Systems: Building and Operating a Simulation Model, Volume II by incorporating modeling techniques that reflect the Logistics Composite Model (LCOM) Software Revision 4.1, 1 January 1981. This report provides a detailed description of the Aeronautical Systems Division (ASD) procedures for using the LCOM. It is intended to serve as a manual of instructions and procedures needed to build and operate an LCOM data base. The main thrust of this report is in the use of LCOM for the acquisition of new weapon systems; however, these techniques may be used for other purposes. Author (GRA)

N83-32663# Naval Postgraduate School, Monterey, Calif.
A SUMMARY OF THE FOUNDATION RESEARCH PROGRAM, FY 1982 Summary Report, 1 Oct. 1981 - 30 Sep. 1982
William M. Tolles Mar. 1983 83 p refs
(ZF66111001)
(AD-A127995; NPS-012-83-001PR) Avail: NTIS HC A05/MF A01 CSCL 05/1

Forty six projects of Independent Research/Independent Exploratory Development were funded by the NPS foundation research program. This research was in the areas of computer

science, mathematics, administrative sciences, operatons research, national security affairs, physics, electrical engineering, meteorology, aeronautics, oceanograhy and mechanical engineering. A tabulation in Appendix identifies area of research and the investigator(s). The category of independent research or independent exploratory research is also identified for each research task.
Author (GRA)

N83-32664# Science Applications, Inc., Orlando, Fla.
USER'S MANUAL FOR TRAINING DEVICE COST MODEL 'TRACOM' Final Report
John Billings Apr. 1983 72 p
(Contract N61339-79-D-0007)
(AD-A128355; PMT-EM-0004-83) Avail: NTIS HC A04/MF A01 CSCL 14/1

TRACOM is a computerized cost model designed to aid the analyst in preparation of Baseline Cost Estimates (BCE). The User's Manual instructs the user how to use the model. The manual describes what data is required, how to input the data, and how to use the model routines to develop a BCE. Author (GRA)

N83-32665# Science Applications, Inc., Orlando, Fla.
USER'S MANUAL FOR COST PROPOSAL EVALUATION PROGRAM (CPEP) Final Report
C. Brouse and J. DeLang Apr. 1983 113 p
(Contract N61339-79-D-0007)
(AD-A128356; PMT-EM-0003-83) Avail: NTIS HC A06/MF A01 CSCL 14/1

The Cost Proposal Evaluation Program (CPEP) is a means to simplify and standardize the methodology for evaluating cost proposals. The User's Manual provides instruction to the cost analyst or evaluation team in the use of the tool. The manual guides the user from a discussion of what data is required (the Cost Proposal Requirements section of an RFP), to a discussion of data preparation after a proposal has been received. The manual continues with step-by-step instructions in the use of the data processing software developed for CPEP. The instructions and the use of the software are both presented in an elementary manner to assist individuals new to cost proposal evaluation. The software provides printouts that are used for comparison to a Government estimate. Costs are presented at various levels of detail, burden or unburdened, inflated or normalized. Author (GRA)

N83-32666# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
PLANNING AND SCHEDULING ENHANCEMENT IN THE AQUISITION PROCESS 2TT THE AERONAUTICAL SYSTEMS DIV. Final Report
High E. Davis and Robert W. Young Nov. 1982 36 p refs
(AD-A128521) Avail: NTIS HC A03/MF A01 CSCL 05/1

This report reviews the current acquisition management environment at ASD. Consideration is given to such factors as the significance of the environment influencing factors and standards which are being set as a result of this environment. The report documents those opportunities which now exist to enhance planning and scheduling within this environment and some current developments which further describe it. Based on these observations some specific recommendations and concerns that may require further study are identified. This report expands upon ASD Reserve Project 78-25, Planning and Scheduling at ASD - A Review and Preliminary Assessment. Author (GRA)

N83-32667# Management Consulting and Research, Inc., Falls Church, Va.
POM (PROGRAM OBJECTIVE MEMORANDUM) FY-85 BP 1500 COST GROWTH AND LEADTIME ADJUSTMENTS: RESEARCH RESULTS Final Report, 1 Oct. 1982 - 28 Feb. 1983
Patricia A. Insley and William P. Hutzler 28 Feb. 1983 85 p refs
(Contract F33615-81-C-5018)
(AD-A128522; MCR-TR-8229-1) Avail: NTIS HC A05/MF A01 CSCL 05/1

This research, Phase 4 of Contract F33615-81-C-5018 (see MCR TR-8104-3), was divided into three tasks: Recommend data sources for FY-85 costs and leadtimes for BP 1500 Federal Supply Classes (FSC). Recommend procedure for incorporating cost and leadtime adjustments in the FY-85 projected budget requirements. Recommend specific price and leadtime adjustments for each Federal Supply Class. The researchers examined cost and leadtime trends, by commodity, and developed factors to be used in refining the BP 1500 cost per flying hour estimates developed by the Logistics Management Institute's Aircraft Availability Model (AAM). In addition to developing factor values to represent projected cost and leadtime trends, the researchers identified sources of data which could be consistently used as part of the requirements estimating process. GRA

N83-32668# Oak Ridge National Lab., Tenn.
MULTIPROGRAM LABORATORY PANEL ENERGY RESEARCH ADVISORY BOARD. VOLUME 2: SUPPORT STUDIES Final Report
Irving Spiewak, Miriam P. Guthrie, Jere P. Nichols, Elizabeth L. Prescon, Colin D. West, Thomas J. Wilbanks, Beverly Y. Wilkes, and Allyn C. Zerby Sep. 1982 203 p refs 3 Vol.
(Contract W-7405-eng-26)
(DE83-002694; DOE/NBB-0023-Vol-2) Avail: NTIS HC A10/MF A01

Statistical data on the multiprogram laboratories; examples of national laboratory use in foreign countries; domestic models for national laboratory utilization; relationships of laboratories with industry and universities; uses of laboratories for training industrial R and D personnel; legal mandates and constraints on the national laboratories are reported. Appendices on facts about Harwell, CEN-Saclay, TNO, Studsvik, and JAERI-Tokai; the Requirements Boards of the United Kingdom Department of Industry; impact of President's FY 1983 budget; and the PNL experiment are included. DOE

N83-32669# National Technical Information Service, Springfield, Va.
BIBLIOGRAPHY OF APPROPIATE TECHNOLOGY INFORMATION FOR DEVELOPING COUNTRIES: SELECTED ABSTRACTS FROM THE NTIS DATA FILE (FOURTH EDITION)
S. Dickson Tenney, ed., Bao Jinzhang, ed., and Prithvi Haldea, ed. Jan. 1983 452 p
(PB83-113852) Avail: NTIS HC A20/MF A01 CSCL 05A

This report was created to support the transfer of useful technology to developing countries. An edited search of the NTIS Bibliographic Data Base was performed to locate Appropriate Technology reports, including those which could be used by technicians to assist people in developing nations. This report contains approximately 3,000 citations with their abstracts. Appropriate Technology is broadly defined as information which can be adapted and applied to help solve local development problems of lower income groups. It is primarily published for use in developing countries for small scale businessmen and industrialists, extension centers, research institutions, farmers, educational institutions, policy planers, and consultants. GRA

N83-32670# National Academy of Sciences - National Research Council, Washington, D. C. Computer Science and Technology Board.
ROLES OF INDUSTRY AND THE UNIVERSITY IN COMPUTER RESEARCH AND DEVELOPMENT Final Report
1982 97 p
(Grant NSF MCS-78-228116)
(PB83-192039) Avail: NTIS HC A05/MF A01 CSCL 05A

Steps to encourage university-industry interaction in computer science research and development are recommended. Possible initiatives in this direction are as follows: increased funding for joint university-industry project; funding for sabbatical visits to or from industry, emphasizing in industry; and organization of special research grants funded jointly by NSF and industry. GRA

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N83-32671* National Aeronautics and Space Administration, Washington, D. C.
NASA PUBLICATIONS GUIDE
1982 16 p refs
(NASA-SP-7047; NAS 1.12/6:7047) Avail: NTIS HC A02 CSCL 05B

The publication programs and management policies of NASA are described and the details that authors and publication specialists need to know to carry out the agency's mission of disseminating the scientific and technical information derived from its activities are highlighted. Topics covered include the various kinds of NASA formal publications; selection of publication medium; printing and distribution; and requirements concerning style and format standards, copyright transfers, the cover, color, and foldouts. The sections of a report are delineated and editorial and page make-up responsibilities are also discussed. A.R.H.

N83-32672# Office of Naval Research, London (England).
EUROPEAN SCIENTIFIC NOTES, VOLUME 37, NUMBER 1 Monthly Publication
Vivian T. Stannett, ed. and Larry E. Shaffer, ed. 31 Jan. 1983 59 p
(AD-A126961; ESN-37-1) Avail: NTIS HC A04/MF A01 CSCL 05/2

European Scientific Notes (ESN) is a monthly publication with brief articles on recent developments in European Scientific research. The publication is not intended to be part of the scientific literature. A partial listing of articles include: The Cardiff Ship Simulator, Radiation processing concerned with polymers and on crosslinking; Gas Kinetics; Corrosion metallurgy, and computer based expert systems; Robotics Research at IRISA; High Temperature Alloys for Gas Turbines 1982; New Techniques for Analyzing Organic Materials; A Systems Approach to Defense Analysis; An Optical Diagnostic for High Current Measurements; New Concepts in Particle Acceleration; and Aggressive European Posture in X-ray astronomy. GRA

N83-32673# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Information Systems.
INTERACTIVE AUTOMATED SYSTEM FOR NORMALIZATION OF RELATIONS M.S. Thesis
Charles T. Travis 18 Mar. 1983 115 p refs
(AD-A127496; AFIT/GCS/EE/83M-4) Avail: NTIS HC A06/MF A01 CSCL 05/2

An interactive Automated System for Normalizing Relations was designed and partially implemented with the goal of interacting it with a Relational Database Management System. In addition, this system was to serve as pedagogical tool for teaching the benefits of normalization for relational database management. Toward these goals, an extensive literature search and analysis of the six normal forms and other pertinent areas of relation normalization was required in order to identify current issues and areas of research. A main concern was overcome by attempting to locate an algorithm to normalize relations. Most authors present a cursory guide to normalization if any at all, but Jeffrey Ullman presents the concept of minimal set. If a minimal set is deduced from an unnormalized relation the resultant relations that are formed are in Third Normal Form. Research was also accomplished in the area of user friendly interactive methods. This was needed because the requirement existed for this system to query the user for functional dependencies in order that relations could later be normalized. Author (GRA)

N83-32674# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Biometry.
KEYWORK-IN-CONTEXT INDEX TO COMPUTERS IN DENTISTRY Progress for 1963-1982
Robin B. Lake (Standard Oil Co.) and Mohandas Bhat Dec. 1982 181 p refs
(Grant T15-LM07001)
(PB83-186361; CWRU/BIOM-82/01) Avail: NTIS HC A09/MF A01 CSCL 05B

This bibliography contains 445 citations on computers in dentistry, spanning almost 20 years of publications in English dating from 1963. It is accessed through a key word in context index (KWIC). The KWIC index contains permuted listings of the titles of references, alphabetically by key words in context. The key works appear in the middle of the line. To the right of each entry is the number that directs the user to the entry in the bibiography proper where complete author(s), titles, sources and an abstract are provided. Author

N83-32675# National Marine Fisheries Service, La Jolla, Calif. Southwest Fisheries Center.
REVISED UPDATE AND RETRIEVAL SYSTEM FOR THE CALCOFI OCEANOGRAPHIC DATA FILE
Lawrence E. Eber and Nancy Wiley Dec. 1982 75 p refs
(PB83-189464; NOAA-TM-NMFS-SWFC-24; NOAA-83040101)
Avail: NTIS HC A04/MF A01 CSCL 06C

Oceanography observations have been made over an extensive grid of stations in the California Current region since 1949. The grid was designed during development of a systematic sampling program to determine the major spawning areas of the Pacific sardine off the coasts of the United States and Baja California, Mexico. With the demise of the sardine, emphasis in the program was redirected toward the Northern Anchovy. The physical and chemical data from CalCOFI surveys have been compiled by SIO into data reports, which include values of temperature, salinity and oxygen tabulated at observed and at standard depths, and computed values of sigma-t, thermosteric anomaly and geopotential anomaly at standard depths. These data have been used by many investigations working on problems associated with the California Current. Author

N83-32652# Joint Publications Research Service, Arlington, Va.
USES OF INFORMATION DISCUSSED
A. Zhuravlev *In its* USSR Rept.: Sci. and Technol. Policy No. 9 (JPRS-82713) 24 Jan. 1983 p 34-37 Transl. into ENGLISH from Sov. Beloruss. (USSR), 5 Oct. 1982 p 2 (For primary document see N83-32647 20-81)
Avail: NTIS HC A05

N83-32653# Joint Publications Research Service, Arlington, Va.
STREAMLINING FLOW OF SCIENTIFIC AND TECHNICAL INFORMATION
T. Borovikova *In its* USSR Rept.: Sci. and Technol. Policy No. 9 (JPRS-82713) 24 Jan. 1983 p 38-39 Transl. into ENGLISH from Turkmenskaya Iskra (USSR), 20 Oct. 1982 p 4 (For primary document see N83-32647 20-81)
Avail: NTIS HC A05

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N83-32676*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CLASSICAL LINEAR-CONTROL ANALYSIS APPLIED TO BUSINESS-CYCLE DYNAMICS AND STABILITY
R. C. Wingrove Jul. 1983 28 p refs
(NASA-TM-84366; A-9357; NAS 1.15:84366) Avail: NTIS HC A03/MF A01 CSCL 05C

Linear control analysis is applied as an aid in understanding the fluctuations of business cycles in the past, and to examine monetary policies that might improve stabilization. The analysis

shows how different policies change the frequency and damping of the economic system dynamics, and how they modify the amplitude of the fluctuations that are caused by random disturbances. Examples are used to show how policy feedbacks and policy lags can be incorporated, and how different monetary strategies for stabilization can be analytically compared. Representative numerical results are used to illustrate the main points.
Author

N83-32677# Army Troop Support and Aviation Materiel Readiness Command, St. Louis, Mo. Cost Analysis Div.
HISTORICAL INFLATION PROGRAM. A COMPUTER PROGRAM GENERATING HISTORICAL INFLATION INDICES FOR ARMY AIRCRAFT, REVISION Final Report
Warren H. Gille, Jr. and James R. Hamilton Mar. 1983 91 p refs
(AD-A127674; TSARCOM-TR-83-1) Avail: NTIS HC A05/MF A01 CSCL 05/3

This report extends and revises Technical Report 82-2 which presents and describes the Historical Inflation Program, a computer program generating historical inflation indices for Army aircraft. The program can be updated monthly, is easily revised for changes in Bureau of Labor Statistics methods, and is capable of handling data for all fiscal year formats. Output is expressed as monthly, quarterly, Fiscal Year, and Calendar Year inflation indices (in Calendar Year 1967 base) and inflation factors (in Fiscal Year base). This report contains updated tables of inflation factors, expressed in a FY 82 base. These indices and factors provide a means of adjusting historical cost data for the procurement of Army aircraft to constant year dollars. Additional features include: computations for the derivation of revised weighting factors, detailed indices enabling the adjustment of historical labor and material costs separately, a discussion of aggregate weighting factors for labor and materials (including trends from sensitivity analysis with more background materials), and additional documentation aimed at making the report useful to a large cross section of the DOD rotary wing aircraft community. This report has been revised to include the latest information concerning the UH-60A BLACK HAWK. Author (GRA)

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N83-32678# Committee on Appropriations (U. S. Senate).
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT-INDEPENDENT AGENCIES APPROPRIATION ACT, 1984
Washington GPO 1983 50 p refs H.R. 3133 enacted into law by the 98th Congr., 1st Sess., 6 Jun. 1983
(S-Rept-98-152) Avail: US Capitol, Senate Document Room

Federal budget appropriations for the National Science Foundation, the National Aeronautics and Space Administration, and the Department of Housing and Urban Development-Independent Agencies are presented. For individual titles, see N83-32679 through N83-32679.

N83-32679# Committee on Appropriations (U. S. Senate).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION RESEARCH AND DEVELOPMENT
In its Dept. of Housing and Urban Develop.-Independent Agencies Appropriations Act, 1984 1983 5 p (For primary document see N83-32678 20-84)
Avail: US Capitol, Senate Document Room

Appropriations for research and development construction of facilities, maintenance, and program management are presented. Funding for the space transportation system, expendable launch vehicles, spaceborne telescopes, TDR satellites, and space communication are included. B.G.

N83-32680# Committee on Appropriations (U. S. House).
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT-INDEPENDENT AGENCIES APPROPRIATION ACT, 1984
Washington GPO 1983 53 p H.R. 3133 enacted into law by the 98th Cong., 1st Sess., 2 Jun. 1983
Avail: US Capitol, House Document Room

Federal budget appropriations for the National Science Foundation, the National Aeronautics and Space Administration, and the Department of Housing and Urban Development-Independent Agencies are presented. For individual title, see N83-32681.

N83-32681# Committee on Appropriations (U. S. House).
SPACE FLIGHT, CONTROL AND DATA COMMUNICATIONS
In its Dept. of Housing and Urban Develop.-Independent Agencies Appropriations Act, 1984 1983 p 26-29 (For primary document see N83-32680 20-84)
Avail: US Capitol, House Document Room

Appropriations for research and development, construction of facilities, maintenance, and program management are presented. Funding for the space transportation system, launch vehicles, spaceborne telescopes, TDR satellites, and space communication are included. B.G.

N83-32682# Committee on Science and Technology (U. S. House).
AUTHORIZATION FOR NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION FOR FISCAL YEARS 1984 AND 1985
Washington GPO 1983 51 p Rept. to accompany H. R. 2900 presented to the 98th Congr., 1st Sess., 16 May 1983
(H-Rept-98-135-Pt-1) Avail: US Capitol, House Document Room

Appropriations for atmospheric, climatic, and ocean pollutions activities of NOAA are recommended. Author

N83-32683# Committee on Science and Technology (U. S. House).
DEPARTMENT OF ENERGY CIVILIAN RESEARCH AND DEVELOPMENT AUTHORIZATION ACT FOR FISCAL YEAR 1984
Washington GPO 1983 105 p Rept. to accompany H. R. 2587 presented by the Comm. on Sci. and Technol. at the 98th Congr., 1st Sess., 3 May 1983
(H-Rept-98-81; GPO-19-900) Avail: US Capitol, House Document Room

Solar energy, geothermal energy, nuclear fission, magnetic fusion, electric energy systems, energy storage systems, and small-scale hydroelectric systems research is summarized. Geothermal resources, high energy physics, nuclear physics and uranium enrichment are also addressed. Author

N83-32684# Committee on Science and Technology (U. S. House).
AUTHORIZING APPROPRIATIONS TO THE NATIONAL SCIENCE FOUNDATION
Washington GPO 1983 93 p Rept. to accompany H. R. 2066 presented to the 98th Congr., 1st Sess., 26 Apr. 1983
(H-Rept-98-73; GPO-19-560) Avail: US Capitol, House Document Room

Appropriations for National Science Foundation programs in Science and engineering education; behavioral, social, and information sciences; proposed policy changes; research instrumentation; U.S. - India joint research program; research to aid the handicapped, Antarctic/arctic reseach policy; women and minorities; earthquake research; scientific computing and networking are authorized. Author

N83-32685# Committee on Science and Technology (U. S. House).
TECHNICAL INFORMATION CLEARINGHOUSE FUND ACT OF 1983
Washington GPO 1983 7 p Rept. to accompany H. R. 2514 presented by the Comm. on Sci. and Technol., 98th Congr., 1st Sess., 9 May 1983
(H-Rept-98-94; GPO-19-864-Pt-1) Avail: US Capitol, House Document Room

Enhancing the transfer of technical information to industry, business, and the general public by establishing a technical information cleaning house fund is addressed. Author

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N83-32686# Committee on Science and Technology (U. S. House).
TECHNOLOGY AND HANDICAPPED PEOPLE
Washington GPO 1983 267 p refs Joint hearing before the Comm. on Sci. and Technol. and the Comm. on Labor and Human Resources, 97th Congr., 2d Sess., No. 163, 29 Sep. 1982
(GPO-12-921) Avail: Subcomm. on Sci., Res. and Technol.

Research, development, and evaluation of technologies, the degree of consumer participation in presently available methods, personnel issues, marketing and production, and financial barriers to the acquisition of technology and its use are discussed. Author

N83-32687*# AiResearch Mfg. Co., Torrance, Calif.
ADVANCED SINGLE PERMANENT MAGNET AXIPOLAR IRONLESS STATOR ac MOTOR FOR ELECTRIC PASSENGER VEHICLES Final Report
E. D. Beauchamp, J. R. Hadfield, and K. L. Wuertz 8 Aug. 1983 226 p refs
(Contracts DEN3-77; DE-AI01-77CS-51044)
(NASA-CR-167974; DOE/NASA/0077-81/1; NAS 1.26:167974; AIRESEARCH-82-19211) Avail: NTIS HC A11/MF A01 CSCL 13F

A program was conducted to design and develop an advanced-concept motor specifically created for propulsion of electric vehicles with increased range, reduced energy consumption, and reduced life-cycle costs in comparison with conventional systems. The motor developed is a brushless, dc, rare-earth cobalt, permanent magnet, axial air gap inductor machine that uses an ironless stator. Air cooling is inherent provided by the centrifugal-fan action of the rotor poles. An extensive design phase was conducted, which included analysis of the system performance versus the SAE J227a(D) driving cycle. A proof-of-principle model was developed and tested, and a functional model was developed and tested. Full generator-level testing was conducted on the functional model, recording electromagnetic, thermal, aerodynamic, and acoustic noise data. The machine demonstrated 20.3 kW output at 1466 rad/s and 160 dc. The novel ironless stator demonstated the capability to continuously operate at peak current. The projected system performance based on the use of a transistor inverter is 23.6 kW output power at 1466 rad/s and 83.3 percent efficiency. Design areas of concern regarding electric vehicle applications include the inherently high windage loss and rotor inertia. Author

N83-32688# Army Military Personnel Center, Alexandria, Va.
THE COMMERCIALIZATION OF NEW TECHNOLOGIES TRANSFER FROM LABORATORY TO FIRM M.S. Thesis - MIT. Final Report
Harvey D. Jones, Jr. 9 May 1983 138 p refs
(AD-A128233) Avail: NTIS HC A07/MF A01 CSCL 05/1

The purpose of this thesis is to conduct field research on those factors that impact the successful transfer of technologies from university R&D labs to the market. In order to narrow the scope and focus of the investigation, the specific issue of technology maturity and its impact on the innovation process is examined. Five cases involving actual transfers of medical technologies form universities into firms in the greater Boston area were developed from a series of structured interviews, analyzed with respect to issue of technology maturity, and used as the basis for drawing specific conclusions about the interorganizational transfer of technologies. GRA

88 SPACE SCIENCES (GENERAL)

N83-32689# Royal Norwegian Council for Scientific and Industrial Research, Oslo. Space Activity Div.
SPACE RESEARCH IN NORWAY Annual Report, 1982
Arne Gundersen and Ann-Lisbeth Ruud Jan. 1983 42 p refs
(SAD-102-T; ISBN-82-7224-190-0) Avail: NTIS HC A03/MF A01

Space physics, astrophysics, and life science programs are described. Rocket, balloon, and ground based studies of the atmosphere (especially the ionosphere) and solar radiation are outlined. Ultraviolet investigation of the upper atmospheric layers of the Sun and stars is summarized. Photometry of peculiar stars, comet astrometry, and cosmic radiation at lambda = 3 cm are mentioned. Graviperception and responses in higher plants were studied. Author (ESA)

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N83-32690*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
IMAGE MOTION COMPENSATION BY AREA CORRELATION AND CENTROID TRACKING OF SOLAR SURFACE FEATURES
M. E. Nein, W. R. McIntosh, and N. P. Cumings Jul. 1983 17 p refs
(NASA-TM-82538; NAS 1.15:82538) Avail: NTIS HC A02/MF A01 CSCL 03A

An experimental solar correlation tracker was tested and evaluated on a ground-based solar magnetograph. Using sunspots as fixed targets, tracking error signals were derived by which the telescope image was stabilized against wind induced perturbations. Two methods of stabilization were investigated; mechanical stabilization of the image by controlled two-axes motion of an active optical element in the telescope beam, and electronic stabilization by biasing of the electron scan in the recording camera. Both approaches have demonstrated telescope stability of about 0.6 arc sec under random perturbations which can cause the unstabilized image to move up to 120 arc sec at frequencies up to 30 Hz. Author

N83-32691# Columbia Univ., New York. Astrophysics Lab.
A PROGRAM OF GROUND-BASED ASTRONOMY TO COMPLEMENT EINSTEIN OBSERVATIONS Annual Scientific Report, 1 Oct. 1981 - 30 Sep. 1982
David J. Helfand and Gary A. Chanan 30 Nov. 1982 17 p refs
(Grant AF-AFOSR-0014-82; AF Proj. 2311)
(AD-A127148; AFOSR-83-0264TR; CAL-1511) Avail: NTIS HC A02/MF A01 CSCL 03/1

The objective of the funded research is to formulate and carry out a program of ground-based astronomical observations to complement X-ray data accumulated with the Einstein Observatory, and to use the results of these multiwavelength studies in addressing a number of significant astrophysical problems of current interest. The work focuses on three main topics: quasar emission mechanisms and their evolution; the structure and evolution of supernova remnants and the neutron stars which they may contain; and, the processes leading to high energy emission in the outer atmosphere (winds, coronae, etc.) of main sequence stars. The physics to be addressed ranges from the generation and energetics of neutron star particle beams and their interaction with the surrounding medium to the details of supernova shock waves and their role in cosmic ray acceleration; from the basic structure of matter at supernuclear densities in neutron star interiors to the basic structure of the Universe as revealed in the evolution of quasars; and, from the study of the radiation processes in distant active galactic nuclei to the identification of the critical parameters which determine the level of coronal activity in nearby

late-type stars. A detailed progress report is contained in section C below; sections D and F list the of the research reports and papers. GRA

N83-32692# Royal Observatory, Edinburgh (Scotland).
[ACTIVITIES IN ASTRONOMY] Annual Report, 30 Sep. 1980 1979 50 p refs
(ISBN-0-902553-23-2; ISSN-0309-0108) Avail: NTIS HC A03/MF A01

The commissioning program of the United Kingdom Infrared Telescope is described. Activities of the Schmidt telescope unit, particularly the plate library are summarized. Research concerning interplanetary and interstellar matter, nebulae and star clusters, Magellanic clouds, quasars, and galactic structure is outlined. Author (ESA)

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N83-32693*# National Aeronautics and Space Administration, Washington, D. C.
THE A-STARS: PROBLEMS AND PERSPECTIVES. MONOGRAPH SERIES ON NONTHERMAL PHENOMENA IN STELLAR ATMOSPHERES
Sidney C. Wolff 1983 251 p refs Prepared in cooperation with Centre National da la Recherche Scientifique, Paris
(NASA-SP-463; NAS 1.21:463; LC-83-061448) Avail: NTIS HC A12/MF A01 CSCL 03B

Normal A type stars, nonradiative heating in A type stars, magnetic Ap stars. The Am stars, the delta Scu stars, A supergiants, peculiar B type stars, and model atmospheres are addressed. Author

N83-32694# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE NET EFFECT OF MANY GRAVITATIONAL FIELDS ON THE INTENSITY OF CELESTIAL LIGHT SOURCES M.S. Thesis
George Edward Cipperly Dec. 1982 123 p refs
(AD-A127514; AFIT/GEP/PH/82D-4) Avail: NTIS HC A06/MF A01 CSCL 03/2

This thesis investigates the lens-like action of the gravitational fields of celestial bodies, which can alter the apparent intensity of more distant sources. Previous work in this area has shown that the chance of an individual body being sufficiently well aligned with a source to cause a very large gravitational intensity change is small. The issue addressed in this study is the possibility of there being a significant total change in the intensity of a source due to the combined effects of the gravitational fields of all celestial bodies, and in particular, the potential impact on intensity distance measurements, that is, determination of the distances of celestial light sources by means of intensity comparisons. It is first shown that the problem can be treated in flat space by associating an appropriate index of refraction with gravitational fields. A wave approach is taken in deriving the total deflection of a ray by the field of a single point mass. A statistical analysis is then performed to determine the expression for the mean total change in the intensity of celestial light sources due to the combined fields of all intervening bodies. GRA

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N83-32695*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATURN AS A RADIO SOURCE
M. L. Kaiser, M. D. Desch, W. S. Kurth, A. Lecscheux, F. Genova, and B. M. Pedersem May 1983 65 p refs Submitted for publication
(NASA-TM-85023; NAS 1.15:85023) Avail: NTIS HC A04/MF A01 CSCL 03B

Magnetospheric radio emissions, Saturn electrostatic discharges, inferred source locations, and emission theories are addressed. Author

N83-32696*# Atmospheric and Environmental Research, Inc., Cambridge, Mass.
OUTER SATELLITE ATMOSPHERES: THEIR NATURE AND PLANETARY INTERACTIONS Annual Report, 1 Jun. 1982 - 31 May 1983
William H. Smyth and Michael R. Combi Jul. 1982 30 p refs (Contract NASw-3387)
(NASA-CR-172945; NAS 1.26:172945) Avail: NTIS HC A03/MF A01 CSCL 03B

Significant progress is reported in early modeling analysis of observed sodium cloud images with our new model which includes the oscillating Io plasma torus ionization sink. Both the general w-D morphology of the region B cloud as well as the large spatial gradient seen between the region A and B clouds are found to be consistent with an isotropic flux of sodium atoms from Io. Model analysis of the spatially extended high velocity directional features provided substantial evidence for a magnetospheric wind driven gas escape mechanism from Io. In our efforts to define the source(s) of hydrogen atoms in the Saturn system, major steps were taken in order to understand the role of Titan. We have completed the comparison of the Voyager UVS data with previous Titan model results, as well as the update of the old model computer code to handle the spatially varying ionization sink for H atoms. Author

N83-31625# Joint Publications Research Service, Arlington, Va.
DISCUSSION OF HALLEY'S COMET PROJECTS
V. Petrenko *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 37-39 Transl. into ENGLISH from Pravda Ukr. (Kiev), 7 Apr. 1983 p 4 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

N83-31627# Joint Publications Research Service, Arlington, Va.
INTERACTION OF SOLAR WIND WITH MAGNETOSPHERE OF VENUS
T. Breus and K. Gringauz *In its* USSR Rept.: Space, No. 23 (JPRS-83994) 28 Jul. 1983 p 55-57 Transl. into ENGLISH from Pravda (Moscow), 10 Jan. 1983 p 7 (For primary document see N83-31617 20-12)
Avail: NTIS HC A06

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N83-32697# Naval Research Lab., Washington, D. C.
A QUANTITATIVE STUDY OF MAGNETIC FLUX TRANSPORT ON THE SUN
N. R. Sheeley, Jr., J. P. Boris, T. R. Young, Jr., C. R. DeVore (Berkeley Research Association), and K. L. Harvey (Solar Physics Research Corp.) 15 Feb. 1983 8 p refs Presented at the IAU Symp. No. 102 on Solar and Stellar Magnetic Fields: Origins and Coronal Effects, Zurich, 2-6 Aug. 1982 Submitted for publication (Contract MIPR-FY1218203062; AF Proj. 2311)
(AD-A127122; AFGL-TR-83-0024) Avail: NTIS HC A02/MF A01 CSCL 03/2

A computational model, based on diffusion, differential rotation,

and meridional flow, has been developed to simulate the transport of magnetic flux on the Sun. Using Kitt Peak magnetograms as input, as have determined a best-fit diffusion constant by comparing the computed and observed fields at later times. This paper presents the initial results of a project to simulate the transport of solar magnetic flux using diffusion, differential rotation, and meridional flow. The study concerns the evolution of large-scale fields on a time scale of weeks of years, and ignores the rapid changes that accompany the emergence of new magnetic regions and the day-to-day changes of the supergranular network itself. GRA

N83-32698# Rochester Univ., N. Y. Dept. of Mechanical Engineering.
DYNAMICAL PHENOMENA IN SUNSPOTS Final Report, 1 Mar. - 31 Jul. 1982
Alan H. Nye 29 Oct. 1982 26 p refs
(Grant AF-AFOSR-0214-82; AF Proj. 2311)
(AD-A126931; AFOSR-83-0197TR) Avail: NTIS HC A03/MF A01 CSCL 03/2

Observations were taken of a sunspot on August 18 and 21, 1980 with high spatial and temporal resolution, in spectral lines formed in the photosphere and chromosphere. The data has been reduced and the results of the analysis are given in this report. A typical moving magnetic feature (MMF) was observed in velocity, intensity, and magnetic field. New information included an observed downflow of 400m/s centered in the feature. The lifetime of the MMF is dependent on the type of observation and needs to be defined clearly. The umbral flashes and umbral oscillations are the same feature with different amplitudes. The flash seems due to saturation of the film. With high resolution it is shown that the umbral oscillations exhibit a characteristic Z pattern when the Calcium II H profiles is plotted in a time series. Five-minute oscillations were clearly detected in the sunspot photosphere. They are the passive response of the umbra to the global p-mode oscillations of the quiet photosphere. The particular modes observed depend on the geometry of the sunspot at different depths. The observations can be used as a probe of sunspot structure below the visible surface. Author (GRA)

N83-32699# Systems and Applied Sciences Corp., Riverdale, Md.
FINAL TACTICAL DECISION AID (FTDA) FOR INFRARED (8-12 MICROMETERS) SYSTEMS, MANUAL VERSION. APPENDIX B: INSOLATION AND SKY RADIATION TABLES
Donald B. Hodges, Ralph Shapiro, C. N. Touart, and Ronald F. Wachtmann 15 Sep. 1982 378 p
(Contract F19628-81-C-0042; AF Proj. 2688)
(AD-A127853; AFGL-TR-82-0294-App-B; SCIENTIFIC-3-App-B) Avail: NTIS HC A17/MF A01 CSCL 03/2

Tables are presented for use in determining solar irradiance and sky radiation values needed to calculate maximum lock-on range (MLOR) and maximum acquisition range (AR) from the Manual Version of the IR FTDA. A table for use in determining solar irradiance as a function of terrain elevation is also presented. Errors in computed sea level values of sky radiation as a function of terrain elevation are discussed and found to be small. GRA

N83-32700*# Stanford Univ., Calif. Inst. for Plasma Research.
COMPARISON OF HELIOSPHERIC CURRENT SHEET STRUCTURE OBTAINED FROM POTENTIAL MAGNETIC FIELD COMPUTATIONS AND FROM OBSERVED POLARIZATION CORONAL BRIGHTNESS
John M. Wilcox and A. J. Hundhausen (National Center for Atmospheric Research) Feb. 1983 19 p refs Presented at the Solar Wind 5 Conf., Woodstock, Vt., Nov. 1982 Sponsored in part by Max C. Fleischmann Foundation
(Contract NAS5-24420; Grant NGR-05-020-559; Contract N00014-76-C-0207; Grant NSF ATM-77-20580)
(NASA-CR-172832; NAS 1.26:172832; AD-A127652; SU-IPR-953) Avail: NTIS HC A02/MF A01 CSCL 08/14

The report compares the structure of the heliospheric current sheet early in Sunspot Cycle 21 as computed from the observed photospheric magnetic field with a potential field approximation, and as inferred from synoptic maps of the observed coronal polarization brightness. On most of the solar rotations compared, the two methods give essentially the same results; the basic shape of the warped current sheet and the amplitude (in solar latitude) of the displacements of the sheet from the solar equator are similar. On one rotation the current sheet computed with the potential field approximation appears to be distorted by a large photospheric region of unbalanced magnetic flux. Author (GRA)

N83-32701# Delaware Univ., Newark. Research Foundation.
ALFVEN WAVES IN THE SOLAR WIND IN ASSOCIATION WITH SOLAR ENERGETIC PARTICLES: SUNSPOT UMBRAL ORIGIN Final Report, 1 Oct. 1980 - 31 Mar. 1983
D. J. Mullan and A. J. Owens Hanscom AFB, Mass. AFGL 4 Feb. 1983 89 p refs
(Contract F19628-81-K-0004; AF Proj. 2311)
(AD-A128046; AFGL-TR-83-0028) Avail: NTIS HC A05/MF A01 CSCL 03/2

We report on a search for Alfven waves in the solar wind during solar particle events. During the period June 6-8, 1979, we find clear signatures of outgoing Alfven waves which could have been released from the sun simultaneously with the initial release of energetic particles. The waves are soliton-like, with durations of 200-900 seconds. An isolated square Alfven solution is also seen when the first particles (with E approximately 57 MeV) are detected: the width of this solution is approximately 950 seconds. A series of five small amplitude spikes in the magnetic field are also seen, preceding the arrival of the first particles by a few hours. The spikes are separated by intervals of 854 + or - 20 seconds. We suggest that these periodicities are determined by conditions at the sun. The features which we have detected are consistent with Alfven waves released from the umbra of a sunspot during a flare. Author (GRA)

N83-32702# National Center for Atmospheric Research, Boulder, Colo.
JOINT SOLAR DYNAMICS PROJECT DATA SUMMARY. VOLUME 1: CHROMOSPHERIC AND CORONAL OBSERVATIONS Technical Note, 14 Jun. - 13 Aug. 1982
R. R. Fisher, C. J. Garcia, K. A. Rock, P. H. Seagraves, and E. A. Yasukawa Nov. 1982 156 p refs Sponsored in part by NSF
(PB83-175638; NCAR/TN-202) Avail: NTIS HC A08/MF A01 CSCL 03B

Photospheric, chromospheric and coronal data were collected by the Mees Solar Observatory and the Mauna Loa Solar Observatory (NCAR) over the period 14 June - 13 August 1982. Data are presented in a 2 pag per day format with four solar images (H(alpha), CaII, H(alpha) Limb, and Sunspot) and four coronal contour maps. A listing of data coverage for this period and summary of solar activity detected during this period are included. GRA

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N83-32703# Naval Research Lab., Washington, D. C. Gamma and Cosmic Ray Astrophysics Branch.
COSMIC RAY EFFECTS ON MICROELECTRONICS. PART 2: THE GEOMAGNETIC CUTOFF EFFECTS Interim Report
J. H. Adams, Jr., J. R. Letaw, and D. F. Smart 26 May 1983 48 p refs
(RR0340643)
(AD-A128601; NRL-MR-5099) Avail: NTIS HC A03/MF A01 CSCL 03/2

The earth's magnetic field modulates the energy spectra of

charged particle radiation reaching a satellite from outside the magnetosphere. This report describes how a transmission function is calculated that modulates the radiation environment in the interplanetary medium to obtain the orbit-averaged radiation environment at the skin of any spacecraft in a circular orbit. It is found that the location of the electronics package within the spacecraft may affect the soft upset rate. Author (GRA)

N83-32704# Los Alamos Scientific Lab., N. Mex.
GAMMA BURSTS
Stirling A. Colgate and Albert G. Petschek 9 Dec. 1982 6 p refs Presented at the Meeting on Numerical Astrophys., Urbana, Ill., 21-23 Oct. 1982
(DE83-004810; LA-UR-82-3596) Avail: NTIS HC A02/MF A01

The origin of cosmic gamma bursts is discussed. Radiation thermalization in magnetic fields, spectral mechanisms, and charge separation and photon heating are discussed. DOE

99 GENERAL

N83-32705# National Aerospace Lab., Amsterdam (Netherlands).
INCLUDES INFORMATION ABOUT THE SCIENTIFIC COMMITTEE NLR-NIVR, INTERNATION COLABORATION IN THE FRAMEWORK OF AGARD, ETW AND GARTEUR AND ALSO ABOUT THE COLABORATION WITH INDONESIA Annual Report
1981 133 p refs Original document contains color illustrations
Avail: NTIS HC A07/MF A01

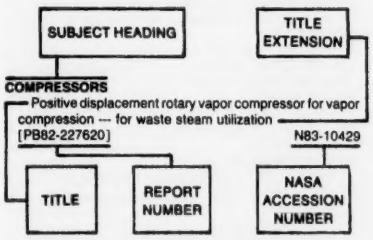
Progress in Dutch Aerospace engineering and research is reported. Topics discussed are: (1) scientific research on flow distribution, aircraft construction and materials, space flights, remote sensing, ecology and energy production; (2) technical utilization in flow research, flight mechanics, construction and materials, space research; (3) numerical forecasting methods for fatigue fracture growth under mechanical loads, information systems on data storage and date dissemination (EDIPAS); (4) library and documentation; (5) internal and external relations; (6) scientific committee NLR-NIVR; (7) international cooperation.
Transl. by E.A.K.

N83-32706# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CALENDAR OF SELECTED AERONAUTICAL AND SPACE MEETINGS
Jul. 1983 128 p
(AGARD-CAL-83/1) Avail: NTIS HC A07/MF A01

Meetings in aerospace medicine and biology; electronics, optics, and metrology; flight mechanics; fluid dynamics and acoustics; navigation, guidance, and control; thermodynamics, combustion, propulsion, and energetics; structures, materials, and applied mechanics; atmospheric physics and Earth environment; and information documentation, and data processing are tabulated. N.W.

SUBJECT INDEX

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7051).

A

A STARS
The A-stars: Problems and perspectives. Monograph series on nonthermal phenomena in stellar atmospheres
[NASA-SP-463] N83-32693

ABILITIES
Private pilot flight skill retention 8, 16 and 24 months following certification
[DOT/FAA/CT-83/34] N83-32303

ABORTED MISSIONS
Commentary on Soyuz T-8 rendezvous failure
N83-31619

ABSOLUTE ZERO
Some experiments in low-temperature thermometry
[DE83-004179] N83-32510

ABSORBENTS
High-resolution electron-energy-loss spectroscopy and photoelectron-diffraction studies of the geometric structure of adsorbates on single-crystal metal surfaces
[DE83-003395] N83-31764

ABSORBERS (MATERIALS)
Effect of the extent of cure on the modulus, glass transition, water absorption, and density of an amine-cure epoxy
[AD-A127090] N83-31859

ABSORPTIVITY
Simultaneous determination of molar absorption coefficients and equilibrium constants for monomer-dimer equilibria
[AD-A128599] N83-31871

ABSTRACTS
The 1983 AFOSR/AFRPL Chemical Rocket Research Meeting
[AD-A127812] N83-31756
Computer program abstract as software documentation
[DE83-007570] N83-32391
A summary of the foundation research program, FY 1982
[AD-A127995] N83-32663

ACCELERATION (PHYSICS)
Predicting the acceleration of northward-moving tropical cyclones using upper-tropospheric winds
[AD-A127446] N83-32235

ACCELERATION STRESSES (PHYSIOLOGY)
Evoked potential studies of the effects of impact acceleration on the motor nervous system
[AD-A127562] N83-32278
Detection of retinal ischemia prior to blackout by electrical evoked cortical responses
[AD-A126855] N83-32288

ACCIDENT INVESTIGATION
Post accident procedures for chemicals and propellants
[AD-A127505] N83-32661

ACCIDENTS
Post accident procedures for chemicals and propellants
[AD-A127505] N83-32661

ACCLIMATIZATION
Hypohydration and acclimation: Plasma renin activity and aldosterone during heat/exercise stress
[AD-A128154] N83-32294

ACCURACY
A preliminary analysis of human factors affecting the recognition accuracy of a discrete word recognizer for C3 systems
[AD-A128546] N83-31946
The NMR (Nuclear Magnetic Resonance) sensor for calibrating the field of a superconducting solenoid
[AD-A127997] N83-31973
Comparison of algorithms for computing generating-system reliability indexes
[DE83-901863] N83-32079
The equivalence of three techniques for estimating ground reflectance from LANDSAT digital count data
[E83-10378] N83-32131
The West Coast surge prediction experiment 1981-82
[IOS-150] N83-32273

ACID BASE EQUILIBRIUM
Metal input and mobilization in 2 acid-stressed lake watersheds in Maine
[PB83-182022] N83-32201

ACID RAIN
New developments in acid precipitation research
[DE83-000495] N83-32197

ACOUSTIC EMISSION
Use of acoustic emissions to predict ground stability
[PB83-178764] N83-31911

ACOUSTIC LEVITATION
Sounding-rocket flight test of an acoustic mixer by manufacture of a lead-zinc emulsion alloy in microgravity
N83-31652
Development of an acoustic levitation device with a mirror furnace --- for spaceborne applications
N83-31656
Acoustic system for material transport
[NASA-CASE-NPO-15453-1] N83-32515
System for controlled acoustic rotation of objects
[NASA-CASE-NPO-15522-1] N83-32516

ACOUSTIC MEASUREMENT
System for monitoring physical characteristics of fluids
[NASA-CASE-NPO-15400-1] N83-31993

ACOUSTIC PROPAGATION
Three-dimensional parabolic-equation-based estimation of the ocean acoustic field
[AD-A128507] N83-32520

ACOUSTICS
Surface acoustic wave non-linear interactions in lithium niobate
[AD-A127570] N83-32052

ACOUSTO-OPTICS
Laser-based instrumentation for the detection of chemical agents
[DE83-003538] N83-32036

ACQUISITION
Planning and scheduling enhancement in the aquisition process 2tt the Aeronautical Systems Div.
[AD-A126521] N83-32666

ACRYLATES
Synthesis of hydroxy-terminated dinitropropyl acrylate polymers and improved characterization of hydroxy-terminated prepolymers
[AD-A127469] N83-31866

ACTINIDE SERIES
Spectroscopic properties of the f-elements in compounds and solutions
[DE83-007963] N83-31759
Solubilities of actinide solids under oxic conditions
[DE83-002675] N83-31776

ACTIVATED CARBON
Anaerobic treatment of gasified effluents
[DE83-001864] N83-31786

ACTIVATION ENERGY
Singular perturbation approach to flame theory with chain and competing reactions
[DE83-000642] N83-31772

ACTUATORS
Actuator-placement considerations for the control of large space structures
[AD-A128241] N83-31720
Chemistry of glass-ceramic/metal bonding for header applications. 1: Effect of treatments on Inconel 718 and Hastelloy C-276 metallic surfaces --- on actuators and initiators
[DE83-003367] N83-32068

ADAPTATION
Digital communications in spatially distributed interference channels
[AD-A127741] N83-31943
Adaptive finite element processes in structural mechanics
[AD-A127010] N83-32096

ADAPTIVE CONTROL
Adaptive reference voltage generator for firing angle control of line-commutated inverters
[NASA-CASE-MFS-25215-1] N83-31953

ADAPTIVE FILTERS
Design and implementation of multi-input adaptive signal extractions
[AD-A127038] N83-31963

ADHESION
Adhesion of metals experiment simulation and ground-based reference test results N83-31692
The role of chemical bonding in adhesion
[AD-A127467] N83-31867

ADHESION TESTS
Adhesion of metals experiment simulation and ground-based reference test results N83-31692

ADHESIVE BONDING
Improved materials for composite and adhesive joints
[AD-A128569] N83-31739
Thermal barrier coating system having improved adhesion
[NASA-CASE-LEW-1335901] N83-31855

ADHESIVES
Development of phosphorylated adhesives
[NASA-CR-166507] N83-31724
Improved materials for composite and adhesive joints
[AD-A128569] N83-31739

ADIABATIC CONDITIONS
Adiabatic compression of elongated field-reversed configurations
[DE83-003533] N83-32604

ADIPOSE TISSUES
Metabolic and vasomotor insulative responses occurring on immersion in cold water
[AD-A128021] N83-32296
A model of heat loss and thermoregulation for immersion in cold water
[AD-A127854] N83-32300

ADJOINTS
Symmetrisable operators and minimal factorization
N83-32320

ADSORPTION
Adsorption behavior of pure fluids near the gas-liquid critical point N83-31697
Analysis of gas purification by heatless adsorption
[DE83-003965] N83-31783

Absorption of ethanol and water vapor by Silicalite, a hydrophobic molecular sieve
[DE83-004981] N83-31788
Theory of collision-induced ionization of adsorbed species on solid surfaces in the presence of laser radiation
[AD-A128317] N83-32059

AERIAL RECONNAISSANCE
Annual data and verification tabulation Atlantic tropical cyclones 1982
[PB83-184077] N83-32255
K-band radiometric mapping of sea ice
[AD-A128205] N83-32268

AERODYNAMIC CHARACTERISTICS
Estimation programs for dynamic flight test data analysis
[AD-A128527] N83-31585
Aerodynamic ejectors in the UK
[BAE-KRS-N-GEN-243] N83-31594
Aeroelastic properties of straight and forward swept graphite/epoxy wings
[AD-A127014] N83-31734

AERODYNAMIC FORCES
Estimation programs for dynamic flight test data analysis
[AD-A128527] N83-31585

AERODYNAMICS
Air Force Academy Aeronautics Digest, Spring/Summer 1982
[AD-A128248] N83-31571
Contribution to the aerodynamic study of wings and propellers
[NASA-TM-77083] N83-31579
Aerodynamics of airfoils subject to three-dimensional periodic gusts
[AD-A127043] N83-31581
Grid network generation with adaptive boundary points for projectiles at transonic speed
[AD-A128041] N83-31584
The aerodynamics range: A national historic mechanical engineering landmark
[AD-A128042] N83-31706

AEROELASTICITY
Investigation of limit cycle response of aerodynamic surfaces with structural nonlinearities
[AD-A127140] N83-31580
Aeroelasticity in turbomachine-cascades
[AD-A127709] N83-31605

AERONAUTICAL ENGINEERING
Force method optimization II. Volume 2: User's manual
[AD-A128235] N83-32387

AEROSOLS
Laser-based instrumentation for the detection of chemical agents
[DE83-003538] N83-32036

AEROSPACE ENGINEERING
USSR report: Space, no. 23
[JPRS-83994] N83-31617
Ryumin interviewed on Salyut experiments N83-31621

AEROSPACE MEDICINE
Space transportation system biomedical operations support study
[NASA-CR-166834] N83-32286
Annotated bibliography of USAARL (United States Army Aeromedical Research Laboratory) technical and letter reports, 1 June 1963 - 30 April 1983
[AD-A127451] N83-32292
Calendar of selected aeronautical and space meetings
[AGARD-CAL-83/1] N83-32706

AEROSPACE SYSTEMS
Actuator-placement considerations for the control of large space structures
[AD-A128241] N83-31720
Thermal-structural analysis of large space structures: A review of recent advances
[AD-A128016] N83-32107

AEROSPACE TECHNOLOGY TRANSFER
Includes information about the Scientific Committee NLR-NIVR, internation colaboration in the framework of AGARD, ETW and Garteur and also about the colaboraiion with Indonesia N83-32705

AGING (BIOLOGY)
Exponential approximations for two classes of aging distributions
[AD-A127924] N83-32463

AGING (METALLURGY)
The aging of Co-20 percent Ni - 6.5 percent Nb alloy
[BLL-M-34951-(5828.4)] N83-31811

AGRICULTURE
Design of strong, ductile, duplex low alloy steels
[DE83-002606] N83-31834
Technical considerations in choosing alcohol fuels for less-developed countries
[DE83-004644] N83-31891
Use of remote sensing techniques and the universal soil loss equation to determine soil erosion
[PB83-182006] N83-32172

AGRISTARS PROJECT
LANDSAT data preprocessing
[E83-10380] N83-32133
Simulation of meteorological satellite (METSAT) data using LANDSAT data
[E83-10381] N83-32134

AGROPHYSICAL UNITS
Comparison of CRD, APU, and state models for Iowa corn and soybeans and North Dakota barley and spring wheat
[E83-10379] N83-32132

AIR
Hydrogen and sulfur from hydrogen sulfide 2: Ambient temperature electrolysis using oxidation of hydrogen sulfide by air as the prime energy source
[AD-A127488] N83-31749
Preliminary investigation of aluminum combustion in air and steam
[AD-A128566] N83-31757

AIR CONDITIONING EQUIPMENT
Design, construction, testing and evaluation of a residential ice storage air conditioning system
[AD-A128582] N83-32183

AIR FLOW
A model for the surface wind field in complex terrain
[AD-A127030] N83-32234

AIR INTAKES
Scaling laws for vortex induced debris ingestion into air intakes
[BAE-KRS-N-GEN-274] N83-31575
Control means for a gas turbine engine
[NASA-CASE-LEW-14586-1] N83-31603

AIR POLLUTION
New developments in acid precipitation research
[DE83-000495] N83-32197
Analysis of geothermal wastes for hazardous components
[PB83-188680] N83-32203
A scavenging model for stratified precipitation
[DE83-003374] N83-32242

AIR QUALITY
Performance analysis of the Jersey City Total Energy Site
[PB83-185348] N83-32187
Studies in air quality meteorology at North Carolina State University
[PB83-181743] N83-32252

AIR TRAFFIC CONTROL
Software description for the O'Hare runway configuration management system. Volume 2: Low-level pseudocode
[AD-A127828] N83-31592

AIRBORNE EQUIPMENT
Operating instructions manual for Microprocessor Airborne Data Acquisition and Replay (MADAR) module
[AD-A128558] N83-32031

AIRBORNE/SPACEBORNE COMPUTERS
An expert distributed robotics system with comprehension and learning abilities in the aircraft flight domain
[AD-A127739] N83-32401

AIRCRAFT ACCIDENTS
A computer simulation of aircraft evacuation with fire
[NASA-CR-166511] N83-31586

AIRCRAFT ANTENNAS
Near field analysis of airborne antenna
[AD-A127246] N83-31931

AIRCRAFT COMPARTMENTS
CB agent threat to atmosphere inside Navy aircraft
[AD-A127882] N83-31587

AIRCRAFT ENGINES
Engine performance comparison associated with carburetor icing during aviation grade fuel and automotive grade fuel operation
[DOT/FAA/CT-82/110] N83-31604
Spectrometer sensitivity investigations on the spectrometric oil analysis program
[AD-A127969] N83-31752
In-depth survey report of American Airlines plating facility
[PB83-187799] N83-31916

AIRCRAFT EQUIPMENT
Design and test criteria for increased energy-absorbing seat effectiveness
[AD-A128015] N83-31589

AIRCRAFT LANDING
Software description for the O'Hare runway configuration management system. Volume 2: Low-level pseudocode
[AD-A127828] N83-31592
Potential joint civil and military use of military airfields
[PB83-186734] N83-31616
Structures and Dynamics Division: Research and technology plans for FY 1983 and accomplishments for FY 1982
[NASA-TM-85661] N83-32095

AIRCRAFT MAINTENANCE
Combat maintenance concepts and repair techniques using shape memory alloys for fluid lines, control tubes and drive shafts
[AD-A127826] N83-31572
Effect of test result uncertainty on the performance of a context-free troubleshooting task
[AD-A128584] N83-31573
Summary of analysis of sources of forecasting errors in BP 1500 requirements estimating process and description of compensating methodology
[AD-A128548] N83-31574
POM (Program Objective Memorandum) FY-85 BP 1500 cost growth and leadtime adjustments: Research results
[AD-A128522] N83-32667

AIRCRAFT MODELS
Design of a multivariable tracker control law for the A-7D Digitac 2 aircraft
[AD-A127440] N83-31607

AIRCRAFT NOISE
The effect on the measurement of aircraft noise of reflections from the ground
[NPL-AC-102] N83-32517
Interior noise and vibration measurements on operational military helicopters and comparisons with various ride quality criteria
[NASA-TM-84664] N83-32518

AIRCRAFT PRODUCTION
Composites in ground test services --- aircraft manufacturing
[BAE-KGT-N-GEN-00999] N83-31729

AIRCRAFT STRUCTURES
Standard tests for toughened resin composites, revised edition
[NASA-RP-1092-REV] N83-31730
Structures and Dynamics Division: Research and technology plans for FY 1983 and accomplishments for FY 1982
[NASA-TM-85661] N83-32095

AIRCRAFT SURVIVABILITY
Expansion of the scan endgame program for aircraft survivability studies and development of a supporting user's guide
[AD-A127557] N83-31598

AIRFOILS
Wind-tunnel investigation of leading-edge thrust on arrow wings in supersonic flow
[NASA-TP-2167] N83-31577
Improved method for transonic airfoil design-by-optimization
[NASA-CR-166497] N83-31578
Aerodynamics of airfoils subject to three-dimensional periodic gusts
[AD-A127043] N83-31581
Structural element and real blade impact testing, volume 1
[AD-A127744] N83-31606
Electromagnetic scattering
[AD-A127899] N83-31932
Frequency effect of transonic flow over an oscillating airfoil N83-32486
Lift generation due to vortex shedding N83-32488

AIRFRAMES
The F-4C/D life extension program
[AD-A127495] N83-31569
Force method optimization 2. Volume 1: Theoretical development
[AD-A127073] N83-32408

AIRPORTS
Potential joint civil and military use of military airfields
[PB83-186734] N83-31616
Standard tests for toughened resin composites, revised edition
[NASA-RP-1092-REV] N83-31730
Terminal forecast reference notebook for Ramstein AB, Germany
[AD-A128319] N83-32240

AIRSPEED
Flight directors for STOI aircraft
[NASA-CR-166517] N83-31590

ALABAMA
Alabama coastal region ecological characterization. Volume 1: Coastal bibliography
[PB83-180661] N83-32202

ALASKA
Integrated resource inventory for southcentral Alaska (INTRISCA)
[NASA-CR-166514] N83-32150
Daily flow statistics of Alaskan streams
[PB83-180133] N83-32166

ALBEDO
Snow reflectance from thematic mapper
[E83-10391] N83-32144
ALCOHOLS
Study of the surface tension minimum of aqueous alcohol solutions and movements at the air-solution interface
N83-31668
Method for the preparation of polymers
[DE83-004941] N83-31880
Decision models for conducting an economic analysis of alternative fuels for the ice engine
[AD-A127954] N83-31887
ALDOSTERONE
Hypohydration and acclimation: Plasma renin activity and aldosterone during heat/exercise stress
[AD-A128154] N83-32294
ALERTNESS
Psychopharmacological techniques for optimizing human performances
[AD-A128529] N83-32309
ALGORITHMS
Wellborne inertial navigation system
[DE83-004012] N83-31593
Combat performance evaluation of fighter aircraft: A suite of FORTRAN-IV programs based on energy manoeuverability theory
[AD-A128263] N83-31599
A time slot assignment algorithm for a TDMA packet radio network
[AD-A128545] N83-31947
Deconvolution of noisy transient signals: A Kalman filtering application
[DE83-030849] N83-31950
Comparison of algorithms for computing generating-system reliability indexes
[DE83-901863] N83-32079
Optimality criterion methods in structural optimization
[AD-A127991] N83-32106
Tension cutoff and parameter identification for the viscoplastic cap model
[AD-A128304] N83-32217
Dynamic scaling of manipulator trajectories
[AD-A127074] N83-32313
The software scene in the extraction of Eigenvalues from sparse matrices
[AD-A127972] N83-32381
A new algorithm for the solution of optimal control commutative bilinear system
[RR-212] N83-32393
A result on the computational complexity of heuristic estimates for the A algorithm
[AD-A127901] N83-32411
An interface tracking algorithm for the porous medium equation
[AD-A127685] N83-32422
New syndrome decoding techniques for convolutional codes over GFq
[AD-A127955] N83-32432
Analysis of the look ahead Lanczos algorithm
[AD-A128020] N83-32436
Elements of simulation error analysis
[AD-A128497] N83-32450
Algebraic approximation of event tree sequences
[DE82-022169] N83-32452
Least absolute deviations regression
[DE83-004424] N83-32456
Estimation of a filtered marked Poisson process from noisy observations with applications to signal processing
[AD-A127692] N83-32466
BAYR, a data association algorithm based on a Bayesian recursion
[AD-A127460] N83-32468
A decomposition of the Beta distribution, related order and asymptotic behavior
[AD-A127815] N83-32474
Algorithmic methods in probability
[AD-A128536] N83-32475
Algorithms and heuristics for variable-yield lot-sizing
[AD-A127559] N83-32478
Three-dimensional parabolic-equation-based estimation of the ocean acoustic field
[AD-A128507] N83-32520
Binocular shading and visual surface reconstruction
[AD-A127058] N83-32580
Transverse and quantum effects in superfluorescence: Pump dynamics for three-level superfluorescence; An algorithm for transverse, full transient effects in optical bistability in a Fabry-Perot cavity
[AD-A127502] N83-32584
Evaluation of infrared target discrimination algorithms
[AD-A128283] N83-32587
Dual 7 pinhole tomography
[DE83-004589] N83-32591
Magnetic fusion energy and computers. The role of computing in magnetic fusion energy research and development
[DE83-006565] N83-32599
Interactive automated system for normalization of relations
[AD-A127496] N83-32673
ALIPHATIC COMPOUNDS
Kinetics and mechanisms of the reactions of aliphatic free radicals with organocobaloximes and fluoropentaamminecobalt (III) ion and of iron (III) with methyrodoxime
[DE83-004856] N83-31779
ALKALI METALS
IR and visible wavelength obscuration by pyrotechnically generated alkali-halide smokes
[AD-A127616] N83-32581
ALKALINE BATTERIES
A method for making an alkaline battery electrode plate
[NASA-TM-77249] N83-31956
Advanced inorganic separators for alkaline batteries and method of making the same
[NASA-CASE-LEW-13171-2] N83-32176
ALKYL COMPOUNDS
Characterization of internal sales by laser desorption mass spectrometry
[AD-A127916] N83-31746
Unimolecular reactions of nitrites and nitrates
[AD-A127825] N83-32528
ALLOYS
The aging of Co-20 percent Ni - 6.5 percent Nb alloy
[BLL-M-34951-(5828.4)] N83-31811
Directed solidification of 40KKhNM alloy as a further means of improving the torques of small winding springs
[BLL-M-34969-(5828.4)] N83-31814
Achievements and advanced methods of protection of metal and metal articles from corrosion
[BLL-M-34975-(5828.5)] N83-31815
Magnetic-resonance studies of reactively sputtered amorphous silicon-hydrogen alloys
[DE83-004958] N83-31842
Non-linear data fitting for analysis of friction stress and recovery in metal alloys
[NPL-DITC-13/82] N83-32093
Effect of pressure on the resistivity and Hall coefficient of amorphous metallic alloys
[DE83-005399] N83-32631
European Scientific Notes, volume 37, number 1
[AD-A126961] N83-32672
ALPHANUMERIC CHARACTERS
Computer program analysis of helicopter weight estimate relationships utilizing parametric equations
[AD-A128590] N83-31600
Optical character recognition for automated cartography: The advanced development handprinted symbol recognition system
[AD-A127566] N83-32152
ALTITUDE
Preliminary design of an Earth-based debris detection system using current technology and existing installations
[NASA-CR-171680] N83-31705
A comparison of the MSIS and Jacchia-70 models with measured atmospheric density data in the 120 to 200 km altitude range
[AD-A128005] N83-32216
ALUMINATES
Contact noise in superionic ceramics
[AD-A127824] N83-31870
ALUMINUM
Interface character of aluminum-graphite metal matrix composites
[AD-A127590] N83-31736
Preliminary investigation of aluminum combustion in air and steam
[AD-A128566] N83-31757
Nondestructive stress measurements in aluminum
[AD-A127699] N83-31823
ALUMINUM ALLOYS
Low-gravity experiments on Liquid Phase Miscibility Gap (LPMG) alloys: Materials Experiments Assembly (MEA)
N83-31685
Fracture behavior of boron aluminum composites at room and elevated temperatures
[AD-A127492] N83-31737
Alloy with enhanced damping properties
[BLL-M-34953-(5828.4)] N83-31805
Production of an aluminium-lead alloy in micro-gravity
[BLL-M-28685-(5828.4)] N83-31807
Advanced aluminum-lithium base alloys produced by rapid solidification from the melt
[AD-A127571] N83-31822
On fatigue crack growth in a Ti-4, 5Al-5Mo-1.5Cr alloy with metastable beta-phase
[AD-A128048] N83-31825
A study of the uranium-aluminum-silicon system
[DE83-002345] N83-31836
Rapid solidification studies of Ni3Al alloys
[DE83-004648] N83-31838
A general purpose residual stress analyzer
[AD-A127820] N83-32109
The measurement of X-ray residual stress in textured cubic materials
[AD-A127822] N83-32620
ALUMINUM BORON COMPOSITES
Structural element testing and real blade impact testing, volume 2
[AD-A127957] N83-31738
ALUMINUM COATINGS
Silicon-slurry/aluminide coating --- protecting gas turbine engine vanes and blades
[NASA-CASE-13343-2] N83-31795
ALUMINUM COMPOUNDS
Hydrogenation of carbon monoxide over ruthenium-rhenium on alumina catalysts
[DE83-004975] N83-31785
ALUMINUM OXIDES
Fireproof ceramics and process for their manufacture
[DE83-005021] N83-31881
ALUMINUM SILICATES
Metallic composite materials and microgravity
N83-31641
AMINES
Time resolved study of primary decomposition process for nitro paraffins and nitramines
[AD-A127660] N83-31748
Effect of the extent of cure on the modulus, glass transition, water absorption, and density of an amine-cure epoxy
[AD-A127090] N83-31859
Polycyclic high energy oxidizers
[AD-A128309] N83-31869
Potassium 4-hydroxyamino-5,7-dinitro-4,5-dihydrobenzofurazanide 3-oxide, the first in a series of new primary explosives
[AD-A128557] N83-31888
AMMONIA
Ocean energy system at the Johns Hopkins University Applied Physics Laboratory
[PB83-180034] N83-32185
AMMONIUM COMPOUNDS
Thin films from ammonia-borane
[DE83-003567] N83-32628
AMORPHOUS MATERIALS
Nature of boride phases formed during crystallization of amorphous Fe-B alloys
[BLL-M-35036-(5828.4)] N83-31798
AMORPHOUS SEMICONDUCTORS
Schottky and MIS type amorphous-silicon solar cells
[BMFT-FB-T-83-043] N83-32184
Fundamental models of electronic transport in amorphous semiconductors
[DE83-000313] N83-32626
AMPLIFICATION
Plant step data and gain estimates in the robust feedback tuning regulator problem
[RR-211] N83-31991
AMPLITUDE MODULATION
Adaptive reference voltage generator for firing angle control of line-commutated inverters
[NASA-CASE-MFS-25215-1] N83-31953
AMPLITUDES
Accurate computations for steep solitary waves
[AD-A127706] N83-32261
Estimation of a filtered marked Poisson process from noisy observations with applications to signal processing
[AD-A127692] N83-32466
ANALOG CIRCUITS
Fault diagnosis of nonlinear analog circuits. Volume 4: An isolation algorithm for the analog fault dictionary
[AD-A127020] N83-31959
Fault diagnosis of nonlinear analog circuits. Volume 3: Fault diagnosis in the tableau context
[AD-A127019] N83-31960
ANALOG DATA
Fault diagnosis of nonlinear analog circuits, volume 5. HAFDIC: A program for generating a hard fault dictionary
[AD-A127021] N83-31958
ANALOG TO DIGITAL CONVERTERS
Universal microcomputer interface for data acquisition
[AD-A127875] N83-32346
ANALYSIS (MATHEMATICS)
Elastic fields under a spherical indenter
[AD-A127732] N83-32103
Interaction Between Objective Analysis and Initialization. Proceedings of the 14th Stanstead Seminar
[PB83-186890] N83-32256
ANALYTIC FUNCTIONS
Annals of the Fourier Institute, volume 33, number 1
[ISSN-0373-0956] N83-32329

The theorem of semi-proper complexification N83-32332
Systems of difference-differential equations N83-32334
Characteristic Cauchy problems and solutions of formal power series N83-32335
The density of the leaves of certain Pfaff equations with two variables N83-32337

ANGULAR DISTRIBUTION
Residual-stress characterization by use of elastic-wave-scattering measurements
[DE83-000647] N83-31985

ANGULAR MOMENTUM
Classical and semiclassical aspects of chemical dynamics
[DE83-0002024] N83-31766
Propagation of light ion beam micro- and macrostabilities of rotating ion layer N83-32483

ANGULAR VELOCITY
Velocity discrimination in the peripheral visual field
[AD-A127949] N83-32297
Interferometric angle monitor
[NASA-CASE-GSC-12614-1] N83-32577

ANISOTROPY
Magnetic susceptibility of scandium-hydrogen and lutetium-hydrogen solid-solution alloys from 2 to 300 deg K
[DE83-004786] N83-31846
The inner edge of the plasma sheet and the diffuse aurora
[NASA-TM-85062] N83-32595

ANNEALING
Motive forces of structural changes in ferrosilicon during heating after slight deformations
[BLL-M-35039-(5828.4)] N83-31799

ANNIHILATION REACTIONS
Measurement of strange quark suppression in hadronic vacuum
[DE83-000918] N83-32548

ANNULAR FLOW
Liquid transfer and entrainment correlation for droplet-annular flow
[DE83-007703] N83-32019

ANOMALIES
Space survey techniques benefit geology N83-31630
DSCS 2 LLTWTA helix current anomaly
[AD-A128008] N83-31972

ANTARCTIC REGIONS
Chemical fractionation of brine in the McMurdo Ice Shelf, Antarctica
[AD-A127821] N83-32262

ANTENNA DESIGN
Near field analysis of airborne antenna
[AD-A127246] N83-31931
Measured characteristics of multi-gap loop and asymptotic conical dipole electromagnetic field sensors
[AD-A127817] N83-31974

ANTENNA RADIATION PATTERNS
Near field analysis of airborne antenna
[AD-A127246] N83-31931

ANTENNAS
Fabrication of slender struts for deployable antennas
[NASA-CR-172164] N83-31733

APPROPRIATIONS
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984
[S-REPT-98-152] N83-32678
National Aeronautics and Space Administration research and development N83-32679
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-32680

APPROXIMATION
Three-dimensional computer modeling of electromagnetic fields: A global-lookback lattice-truncation scheme
[DE83-006583] N83-31949
Fiber cobordism and approximation of a singular submanifold by C(infinity) N83-32340
On polynomial approximation in the uniform norm by the discrete least squares method
[AD-A127693] N83-32420
Existence of viscosity solutions of Hamilton-Jacobi equations
[AD-A127691] N83-32421
An interface tracking algorithm for the porous medium equation
[AD-A127685] N83-32422
Algebraic approximation of event tree sequences
[DE82-022169] N83-32452
Development and application of the discrete ordinates-transfer matrix hybrid method for deterministic streaming calculations
[DE82-017387] N83-32457
Simple model order reduction by truncation with performance verification by fast digital simulation
[RR-217] N83-32460
Exponential approximations for two classes of aging distributions
[AD-A127924] N83-32463
Space flight, control and data communications N83-32681

AQUATIC PLANTS
Microbiological control of the aquatic weed Myriophyllum Spp
[PB83-181958] N83-32204

AQUEOUS SOLUTIONS
Study of the surface tension minimum of aqueous alcohol solutions and movements at the air-solution interface N83-31668
Electrolyte solutions near the critical point of water: A review and proposal for studies under microgravity conditions N83-31698
Hydrodesulfurization of chlorinized coal
[NASA-CASE-NPO-15304-1] N83-31743
Spectroscopic properties of the f-elements in compounds and solutions
[DE83-007963] N83-31759
Hydrogen combustion in aqueous foams
[DE83-002534] N83-31775

AQUIFERS
Ground-water resources of the White River Basin, Hamilton and Tipton Counties, Indiana
[PB83-184309] N83-32169

ARC LAMPS
Suitability of a wall-stabilized arc as a transfer standard of spectral radiance in the spectral range 165 to 350 nm
[NPL-QU-65] N83-32479

ARC MELTING
An SEM analysis of bearing failure due to electrical arcing
[AD-A127827] N83-32071

ARC WELDING
Effects of high heat input welding of construction steels A36, A514, and A516
[AD-A127083] N83-31820
Development of narrow gap welding technology for extremely thick steel
[PB83-178913] N83-31909
Reconstituted Charpy impact specimens
[DE83-901113] N83-32113

ARCHITECTURE (COMPUTERS)
Research in VLSI systems. Heuristic programming project and VLSI theory project: A fast turn around facility for Very Large Scale Integration (VLSI)
[AD-A127153] N83-31961
Distributed multiport memory architecture
[NASA-CASE-NPO-15342-1] N83-32342
The application of distributed system architectures for computer-based instructional systems in the Naval Education and Training Command
[AD-A127694] N83-32347

ARGON
Suitability of a wall-stabilized arc as a transfer standard of spectral radiance in the spectral range 165 to 350 nm
[NPL-QU-65] N83-32479

ARGON LASERS
High efficiency picosecond pulse generation in the 675-930 NM region from a dye laser synchronously pumped by an argon-ion laser
[AD-A128033] N83-32058

ARID LANDS
Bibliography on ground-water recharge in arid and semiarid areas
[PB83-182055] N83-32167
Proline metabolism in plants under environmental stresses
[DE83-002735] N83-32284

ARM (ANATOMY)
Thermoregulatory responses to upper body exercise
[AD-A127884] N83-32298

ARMED FORCES (UNITED STATES)
Summary of analysis of sources of forecasting errors in BP 1500 requirements estimating process and description of compensating methodology
[AD-A128548] N83-31574
Fuel conservation evaluation of US Army helicopters. Part 5: AH-1S slight testing
[AD-A128532] N83-31601
Comparison of weight training and calisthentic exercise programs in developing strength and muscular endurance in United States Army recruits
[AD-A128067] N83-32295
Women at sea: Welcome aboard
[AD-A128602] N83-32646
Planning and scheduling enhancement in the aquisition process 2tt the Aeronautical Systems Div.
[AD-A128521] N83-32666

ARRAYS
Digital communications in spatially distributed interference channels
[AD-A127741] N83-31943
Applications of Josephson junction SQUIDs Superconducting Quantum Interference Device) and Arrays
[AD-A127135] N83-31962
Optimum multisensor, multitarget time delay estimation
[AD-A127639] N83-32423
A two-level pipelined systolic array for multi-dimensional convolution
[AD-A127544] N83-32434

ARTERIES
Balanced subclassification in observational studies using the propensity score: A case study
[AD-A127760] N83-32473

ARTIFICIAL INTELLIGENCE
Mini-MCA: An intelligent inspection instrument
[DE83-001979] N83-32038
Computational introspection
[AD-A127132] N83-32399
An overview of artificial intelligence-based teaching aids
[AD-A127702] N83-32400
An expert distributed robotics system with comprehension and learning abilities in the aircraft flight domain
[AD-A127739] N83-32401
An artificial intelligence technique to generate self-optimizing experimental designs
[AD-A127764] N83-32402
Intelligent interpretation of 3-D imagery
[AD-A127710] N83-32583

ASHES
Coal-gasification research studies
[DE83-006604] N83-31763

ASPECT RATIO
Saturated tearing modes in Tokamaks with divertors
[DE83-005589] N83-32598

ASPHALT
An economic analysis of alternative paving materials
[AD-A127534] N83-31903

ASSAYING
Automated on-line L-edge measurement of SNM concentration for near-real-time accounting
[DE83-000666] N83-32039

ASSEMBLER ROUTINES
A data base processor semantics specification package
[NASA-CR-172172] N83-32352

ASTRONOMICAL OBSERVATORIES
A program of ground-based astronomy to complement Einstein observations
[AD-A127148] N83-32691
Activities in astronomy
[ISBN-0-902553-23-2] N83-32692

ASYMMETRY
Mathematical representation of size and electronic factors
[DE83-004182] N83-32455

ASYMPTOTES
The asymptotic variance of higher order crossings
[AD-A127459] N83-32430

ASYMPTOTIC METHODS
Quasiresonance of long life
[AD-A127763] N83-32442
A decomposition of the Beta distribution, related order and asymptotic behavior
[AD-A127815] N83-32474

ASYMPTOTIC SERIES
Asymptotic flame theory with complex chemistry
[DE83-002077] N83-31774
Cylindrical Bessel functions for a large range of complex arguments
[AD-A128049] N83-32428
On a problem concerning spacings
[AD-A128509] N83-32449

ATLANTIC OCEAN
Intraplate seismicity and seismic risk in the Atlantic Ocean based on teleseismically observed earthquakes
[IOS-136] N83-32227

ATMOSPHERIC ATTENUATION
Comparison of modelled and empirical atmospheric propagation data
[E83-10398] N83-32148

ATMOSPHERIC CHEMISTRY
New developments in acid precipitation research
[DE83-000495] N83-32197

ATMOSPHERIC CIRCULATION
Further studies in the application of dynamic initialization for global prediction models with special attention to equatorial waves
[AD-A128511] N83-32241

Studies in air quality meteorology at North Carolina State University
[PB83-181743] N83-32252
Comparison of baroclinic eddy heat transport parameterizations to a simplified general circulation model
[PB83-187849] N83-32257
Use of Eulerian initial conditions in a Lagrangian model of turbulent diffusion
[DE83-003479] N83-32454

ATMOSPHERIC COMPOSITION
Studies in air quality meteorology at North Carolina State University
[PB83-181743] N83-32252
Authorization for National Oceanic and Atmospheric Administration for fiscal years 1984 and 1985
[H-REPT-98-135-PT-1] N83-32682

ATMOSPHERIC CORRECTION
LANDSAT data preprocessing
[E83-10380] N83-32133
LANDSAT-D investigations in snow hydrology --- Sierra Nevada Mountains
[E83-10382] N83-32135
LANDSAT-D investigations in snow hydrology --- Sierra Nevada Mountains, California
[E83-10388] N83-32141

ATMOSPHERIC DENSITY
Empirical modeling of the geomagnetic variation in the thermosphere
[AD-A127007] N83-32207
A comparison of the MSIS and Jacchia-70 models with measured atmospheric density data in the 120 to 200 km altitude range
[AD-A128005] N83-32216

ATMOSPHERIC HEATING
Global atmospheric waves: Mechanical heating of the lower thermosphere
[AD-A127222] N83-32206

ATMOSPHERIC MODELS
Tactical application of an atmospheric mixed-layer model
[AD-A127527] N83-32212
Atmospheric temperature profiles from Earth limb infrared measurements
[AD-A127536] N83-32214

ATMOSPHERIC MOISTURE
Cloud water: An important vector of atmospheric deposition
[DE83-004646] N83-32244

ATMOSPHERIC PHYSICS
Contact-potential and surface-charge effects in atmospheric-electrical instrumentation
[NASA-CR-172834] N83-32027
Findings and recommendations on various marine, atmospheric, and coastal zone issues
[PB83-186213] N83-32120
USSR report: Earth sciences, no. 26
[JPRS-83622] N83-32121
USSR report: Earth sciences, no. 27
[JPRS-83829] N83-32123

ATMOSPHERIC REFRACTION
Tactical application of an atmospheric mixed-layer model
[AD-A127527] N83-32212

ATMOSPHERIC STRATIFICATION
Tactical application of an atmospheric mixed-layer model
[AD-A127527] N83-32212
A scavenging model for stratified precipitation
[DE83-003374] N83-32242

ATMOSPHERIC TEMPERATURE
Atmospheric temperature profiles from Earth limb infrared measurements
[AD-A127536] N83-32214

ATMOSPHERIC TURBULENCE
Analysis of laser-turbulence utilizing a video tape recorder and digital storage oscilloscope
[AD-A127859] N83-32049
Workshop for the Winter Monsoon Experiment
[AD-A127989] N83-32239

ATOMIC BEAMS
Electromagnetic mirror dynamics
[AD-A127515] N83-31938

ATOMIC CLOCKS
Ultra-stable laser clock
[AD-A127519] N83-32054

ATOMIC COLLISIONS
Four pi physics with the plastic ball
[DE83-004190] N83-32556

ATOMIC PHYSICS
Atomic physics processes in radial transport calculations
[DE83-007172] N83-32535
ZAPP: Z-pinch atomic physics program
[DE83-005390] N83-32606

ATOMIC STRUCTURE
Electronically induced phase transformations
[AD-A127031] N83-31745
Data processing in neutron protein crystallography using positron-sensitive detectors
[DE83-005803] N83-32636
Electronic structure of hcp lutetium
[DE83-004866] N83-32643

ATOMIZING
Bending moments in oxides on the surface of particles of dispersed iron
[BLL-M-34936-(5828.4)] N83-32085

ATTITUDE CONTROL
Actuator-placement considerations for the control of large space structures
[AD-A128241] N83-31720
Attitude control experiment of sounding rocket S-520-5 N83-32491

AUDIO FREQUENCIES
A theoretical model for the Speech Input Device SID3. Part 1: Filters
[NPL-DITC-20/83-PT-1] N83-31921
A post-processing algorithm for time domain pitch trackers
[AD-A127671] N83-31934
Modem signature analysis
[AD-A127993] N83-31939

AUDITORY PERCEPTION
Preliminary evaluation of two dichotic listening tasks as predictors of performance in naval aviation undergraduate pilot training
[AD-A127337] N83-32304

AUDITORY TASKS
Preliminary evaluation of two dichotic listening tasks as predictors of performance in naval aviation undergraduate pilot training
[AD-A127337] N83-32304

AURORAL ZONES
The MITHRAS: A program of simultaneous radar observations of the high-latitude auroral zone
[AD-A127016] N83-32220

AURORAS
Aurora-region dynamics determined with the Chatanika radar
[AD-A127042] N83-32208
Rocketborne measurements of optical emissions from the auroral E-layer
[AD-A127517] N83-32213

AUSTENITE
Crystallography of lath martensite and stabilization of retained austenite
[DE83-003714] N83-31832

AUSTENITIC STAINLESS STEELS
Austenitic thermochemical treatments in a glow discharge
[PB83-184671] N83-31852
Weld-cracking mechanisms in austenitic stainless steels
[DE83-001157] N83-32111

AUTOCORRELATION
Brownian-dynamics computer simulations of one dimensional polymer model. 1: Simple potentials
[DE83-002468] N83-31877
Stationary exponential time series: Further model development and a residual analysis
[AD-A128347] N83-32437
Use of Eulerian initial conditions in a Lagrangian model of turbulent diffusion
[DE83-003479] N83-32454

AUTOMATIC CONTROL
General-purpose stepping motor-encoder positioning subsystem with standard asychronous serial-line interface
[DE83-004634] N83-31987
Automated instrumentation system verification
[AD-A127775] N83-32030
Optical character recognition for automated cartography: The advanced development handprinted symbol recognition system
[AD-A127566] N83-32152
Timing and control monitor system requirements
[DE83-005343] N83-32246
Influence of scanning variables on ultrasonic response
[DE83-003754] N83-32521

AUTOMOBILE FUELS
Decision models for conducting an economic analysis of alternative fuels for the ice engine
[AD-A127954] N83-31887
Preliminary perspective on pure methanol fuel for transportation
[PB83-180232] N83-31892

AUTOREGRESSIVE PROCESSES
Fast Kalman filtering for ARMA (autoregressive moving average) processes: Fixed point implementation
[AD-A126994] N83-32407
Stationary exponential time series: Further model development and a residual analysis
[AD-A128347] N83-32437

AVALANCHES
Effects of snow compaction on water release and sediment yield, Bridger Bowl Ski Area, Gallatin County, Montana
[PB83-186445] N83-32174

AVIONICS
Study of the causes of unnecessary removals of avionic equipment
[AD-A127546] N83-31570
Cost development of the dual-channel GPS (Global Positioning System) navigator for general aviation application
[AD-A127157] N83-31591
Demonstration Advanced Avionics System (DAAS), phase 1
[NASA-CR-166503] N83-31602
Relationship between manufacturing yields and field failure rates of electronic equipment
[AD-A128498] N83-32078

B

BACKSCATTERING
Electromagnetic scattering
[AD-A127899] N83-31932
Backscattering from anisotropic random media
[AD-A127873] N83-31933

BACTERIOLOGY
Microbiological control of the aquatic weed Myriophyllum Spp
[PB83-181958] N83-32204

BALL BEARINGS
Evaluation of outer race tilt and lubrication on ball wear and SSME bearing life reductions
[NASA-CR-170836] N83-32069

BALLISTIC MISSILES
The aerodynamics range: A national historic mechanical engineering landmark
[AD-A128042] N83-31706

BALLISTIC RANGES
Tonopah Test Range capabilities: Technical manual
[DE83-005362] N83-31709

BALLOONS
Polyethylene free balloon design from the perspectives of user and designer
[AD-A127553] N83-31583

BANACH SPACE
On the Radon-Nikodym Theorem N83-32322
Duality in the theory of Banach lattices N83-32323
Some recent results on positive groups and semi-groups N83-32324
Integral operators N83-32325

BANDPASS FILTERS
A theoretical model for the Speech Input Device SID3. Part 1: Filters
[NPL-DITC-20/83-PT-1] N83-31921

BANDWIDTH
Frequency response of finite-aperature sample-and-hold systems
[DE83-002279] N83-32348

BARLEY
Comparison of CRD, APU, and state models for Iowa corn and soybeans and North Dakota barley and spring wheat
[E83-10379] N83-32132

BAROCLINITY
Comparison of baroclinic eddy heat transport parameterizations to a simplified general circulation model
[PB83-187849] N83-32257

BARRIER LAYERS
Biological intrusion barriers for large-volume waste-disposal sites
[DE83-002061] N83-32571

BASIC (PROGRAMMING LANGUAGE)
Basic utility graphics software for the Hewlett-Packard 9845B desktop computer
[PB83-175760] N83-32394

BATHS
Effectiveness of boriding of steel in molten sodium-boron-silicate baths
[BLL-M-34988-(5828.4)] N83-31803

BAYES THEOREM
A small sample evaluation of a Bayesian design method for quantal response model
[AD-A127942] N83-32464
Bayesian models for response surfaces of uncertain functional form
[AD-A127703] N83-32465
Estimation of a filtered marked Poisson process from noisy observations with applications to signal processing
[AD-A127692] N83-32466

BAYR, a data association algorithm based on a Bayesian recursion
[AD-A127460] N83-32468
BAYS (TOPOGRAPHIC FEATURES)
Coherence studies of geomagnetic fluctuations in the frequency range .05 to 10 Hz
[AD-A127708] N83-31936
BEAM CURRENTS
Drag instability in the modified betatron
[AD-A128242] N83-32526
BEAM INJECTION
Continuous Tokamak operation with an internal transformer
[DE83-002340] N83-32600
BEAM WAVEGUIDES
Influence of centering forces on IFR hose instability
[DE83-006719] N83-32536
Proposed 60 GHz transmission line system for Electron Cyclotron Radiation Heating (ECRH) on W 7 Advanced Stellarator (AS)
[IPF-82-17] N83-32612
BEAMS (RADIATION)
Luminosity of continuous beams with crossing angle
[DE83-003279] N83-32593
BEAMS (SUPPORTS)
Development of a cryogenic windtunnel balance
[KB-TE-1-1173] N83-31611
Beam connector apparatus and assembly
[NASA-CASE-MFS-25134-1] N83-31895
Computer analysis for dynamic response of beams and plates on elastic foundations
[AD-A127504] N83-32105
BEARINGS
An SEM analysis of bearing failure due to electrical arcing
[AD-A127827] N83-32071
BEDROCK
Metal input and mobilization in 2 acid-stressed lake watersheds in Maine
[PB83-182022] N83-32201
BEHAVIOR
The thermal basis for disruption of operant behavior by microwaves in three animal species
[AD-A127370] N83-32279
Operant behavior and colonic temperature of rhesus monkeys, Macaca mulatta, exposed to microwaves at frequencies above and near whole-body resonance
[AD-A127326] N83-32280
The effects of CO and HCN on pole-jump avoidance-escape behavior
[NASA-CR-166512] N83-32301
Risk estimates for CO exposure in man based on behavioral and physiological responses in rodents
[NASA-CR-166513] N83-32302
BENDING MOMENTS
Development of a cryogenic windtunnel balance
[KB-TE-1-1173] N83-31611
Bending moments in oxides on the surface of particles of dispersed iron
[BLL-M-34936-(5828.4)] N83-32085
BESSEL FUNCTIONS
Cylindrical Bessel functions for a large range of complex arguments
[AD-A128049] N83-32428
BETA FACTOR
Response of a multi-element dosimeter to calibrated beta sources with E sub max from 0.23 to 3.5 MeV
[DE83-002013] N83-32532
BETA PARTICLES
Beta and low-energy photon irradiation of several commercial phosphors
[DE83-006606] N83-32531
BETATRONS
Drag instability in the modified betatron
[AD-A128242] N83-32526
BIAS
Effect of test result uncertainty on the performance of a context-free troubleshooting task
[AD-A128584] N83-31573
Automation of electric power system (selected articles)
[AD-A127839] N83-32055
BIBLIOGRAPHIES
Bibliography on ground-water recharge in arid and semiarid areas
[PB83-182055] N83-32167
Energy: A continuing bibliography with indexes
[NASA-SP-7043(37)] N83-32178
Alabama coastal region ecological characterization. Volume 1: Coastal bibliography
[PB83-180661] N83-32202
Annotated Tsunami bibliography: 1962-1976
[DE83-900003] N83-32270
Bibliography of technical reports, 1982
[PB83-191064] N83-32274
Annotated bibliography of USAARL (United States Army Aeromedical Research Laboratory) technical and letter reports, 1 June 1963 - 30 April 1983
[AD-A127451] N83-32292
Algorithmic methods in probability
[AD-A128536] N83-32475
A summary of the foundation research program, FY 1982
[AD-A127995] N83-32663
Bibliography of appropiate technology information for developing countries: Selected abstracts from the NTIS data file (Fourth Edition)
[PB83-113852] N83-32669
Keywork-in-context index to computers in dentistry
[PB83-186361] N83-32674
BIMETALS
State of production of bimetals and prospects for its development
[BLL-M-35010-(5828.4)] N83-31800
BINARY ALLOYS
Some aspects of the plastic deformation of phase mixtures with coarse microstructures
[DE83-001624] N83-31828
A study of the uranium-aluminum-silicon system
[DE83-002345] N83-31836
BINARY FLUIDS
Stationary and oscillatory instabilities for mixture subjected to Soret effect in vertical cylinder with axial temperature gradient N83-31661
Periodic crystallization of binary melts under diffusion controlled mass transfer N83-31702
Therymodynamic properties of strongly nonideal fluid mixtures from an xtended quasi-chemical theory
[DE83-004295] N83-32645
BIOASSAY
A small sample evaluation of a Bayesian design method for quantal response model
[AD-A127942] N83-32464
BIOCHEMISTRY
Biochemical analyses for detection and assessment of pollution in the subsurface environment
[PB83-182303] N83-31793
BIODYNAMICS
Technology and handicapped people
[GPO-12-921] N83-32686
BIOELECTRICITY
Evoked potential studies of the effects of impact acceleration on the motor nervous system
[AD-A127562] N83-32278
BIOENGINEERING
The commercialization of new technologies transfer from laboratory to firm
[AD-A128233] N83-32688
BIOGENY
The ABAG biogenic emissions inventory project
[NASA-CR-166498] N83-32151
BIOINSTRUMENTATION
NBS (National Bureau of Standards) and industrial biotechnology: Instrumentation and associated measurement needs
[PB83-191114] N83-32285
BIOLOGICAL EFFECTS
The thermal basis for disruption of operant behavior by microwaves in three animal species
[AD-A127370] N83-32279
Relevance of biotic pathways to the long-term regulation of nuclear-waste disposal. Topical Report on reference western arid low-level sites
[DE83-002575] N83-32576
BIOMASS ENERGY PRODUCTION
Pacific Northwest Regional Biomass Program
[PB83-188623] N83-31893
BIOMEDICAL DATA
Space transportation system biomedical operations support study
[NASA-CR-166834] N83-32286
BIOTECHNOLOGY
NBS (National Bureau of Standards) and industrial biotechnology: Instrumentation and associated measurement needs
[PB83-191114] N83-32285
BIPOLAR TRANSISTORS
GaP/Al-x/Ga-1-x/P heterojunction bipolar junction transistor for high-temperature electronic applications
[DE83-001267] N83-31977
BLACKOUT (PHYSIOLOGY)
Detection of retinal ischemia prior to blackout by electrical evoked cortical responses
[AD-A126855] N83-32288
BLOCKING
A collision resolution protocol with limited channel sensing: Finitely many users
[AD-A128501] N83-31948
BLOOD PLASMA
Hypohydration and acclimation: Plasma renin activity and aldosterone during heat/exercise stress
[AD-A128154] N83-32294
BLOWDOWN WIND TUNNELS
The TOPSY guide. Transient tunnel operating, data acquisition and processing system. User's and programmer's guides
[OUEL-1462/83] N83-31610
BLUE GREEN ALGAE
Viral control of nuisance blue-green algae. Part 2: Cyanophage strains, stability studies of phages and hosts, and effects of environmental factors on phage-host interactions
[PB83-178129] N83-32200
BLUNT BODIES
Wind-tunnel investigation of leading-edge thrust on arrow wings in supersonic flow
[NASA-TP-2167] N83-31577
BODY TEMPERATURE
The thermal basis for disruption of operant behavior by microwaves in three animal species
[AD-A127370] N83-32279
Temperature cycling in rats exposed repetitively to radiofrequency radiation
[AD-A126895] N83-32281
Circadian growth hormone and prolactin blood concentration during a self-limited viral infection and artificial hyperthermia in man
[AD-A127501] N83-32289
BODY WEIGHT
A model of heat loss and thermoregulation for immersion in cold water
[AD-A127854] N83-32300
BODY-WING CONFIGURATIONS
Wind tunnel experiments on the divergence of swept wings with composite structures
[AD-A127950] N83-31582
BOILERS
Small continuous ethanol plant for farm
[DE82-014675] N83-31890
BOLTS
Procedure for testing mechanical properties of high-tensile alloy-steel bolts
[BLL-M-26991-(5828.4)] N83-31801
BOLTZMANN TRANSPORT EQUATION
Exact direct-simulation-scheme for the Boltzmann equation/correlation of molecular velocities subject to renewal processes N83-32492
Monte Carlo simulation in molecular gas dynamics N83-32500
BOLTZMANN-VLASOV EQUATION
Recent developments in the investigations on the gas-surface interactions N83-32499
BOOLEAN FUNCTIONS
Preliminary investigation of interconnected systems interactions for the safety injection system of Indian Point-3
[DE83-009172] N83-32451
BORANES
Thin films from ammonia-borane
[DE83-003567] N83-32628
BOREHOLES
Drilling at accesses to Earth's mantle N83-32122
BORIDES
Nature of boride phases formed during crystallization of amorphous Fe-B alloys
[BLL-M-35036-(5828.4)] N83-31798
Effectiveness of boriding of steel in molten sodium-boron-silicate baths
[BLL-M-34988-(5828.4)] N83-31803
BORON
Fracture behavior of boron aluminum composites at room and elevated temperatures
[AD-A127492] N83-31737
Observation of a first-order phase transition in single-crystal ErRh-4B4 at Hc-2
[DE83-008609] N83-32623
BOUNDARY LAYER COMBUSTION
Large-scale experiments on turbulent flame and pressure development
[PB83-177840] N83-31791
BOUNDARY LAYER EQUATIONS
Analysis of steady, 2-dimensional chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique. Volume 1: Theoretical development
[AD-A127219] N83-31997
BOUNDARY LAYERS
Solidification front dynamics in model systems N83-31689
BOUNDARY VALUE PROBLEMS
Electromagnetic scattering
[AD-A127899] N83-31932

An interface tracking algorithm for the porous medium equation
[AD-A127685] N83-32422
A boundary value problem for quasilinear degenerate parabolic equations
[AD-A127729] N83-32424
On collocation schemes for quasilinear singularity perturbed boundary value problems
[AD-A127727] N83-32426
An analysis of a finite element method for convection-diffusion problems. Part 2: A posteriori error estimates and adaptivity
[AD-A128261] N83-32439
Some aspects of critical point theory
[AD-A127757] N83-32446
Quasilinear elliptic-parabolic differential equations
[PREPRINT-568] N83-32458
Self-semilar solutions of hydrodynamic equations for expanding layer with boundary condition specified by differential equation N83-32481

BRAIN CIRCULATION
Detection of retinal ischemia prior to blackout by electrical evoked cortical responses
[AD-A126855] N83-32268

BRAZIL
Preliminary statistical studies concerning the Campos RJ sugar cane area, using LANDSAT imagery and aerial photographs
[E83-10384] N83-32137
Application of MSS/LANDSAT images to the structural study of recent sedimentary areas: Campos Sedimentary Basin, Rio de Janeiro, Brazil
[E83-10385] N83-32138

BREADBOARD MODELS
Development of advanced heating facility concepts for microgravity application N83-31653

BREAKING
The breaking of axisymmetric noncylindrical liquid bridges N83-31678
Stability of axisymmetric liquid bridges N83-31679

BRIDGES (STRUCTURES)
Polymer concrete patching manual
[PB83-180265] N83-31912

BRINES
Chemical fractionation of brine in the McMurdo Ice Shelf, Antarctica
[AD-A127821] N83-32262
Thermal-gradient migration of brine inclusions in salt crystals
[DE83-004180] N83-32633

BRITTLENESS
The brittle to ductile transition in polycrystalline ice under tension
[AD-A127701] N83-32102

BROADBAND
Wideband HF channel prober: System description
[AD-A127040] N83-31924

BROADCASTING
Naval communications processing and routing system (NAVCOMPARS): A model for broadcast performance analysis
[AD-A127990] N83-31940

BROWNIAN MOVEMENTS
Brownian-dynamics computer simulations of one dimensional polymer model. 1: Simple potentials
[DE83-002468] N83-31877
Malliavin's calculus and stochastic integral representations of functionals of diffusion processes
[AD-A127726] N83-32427
Two models of time constrainted target travel between two endpoints constructed by the application of Brownian motion and a random tour
[AD-A127805] N83-32448
Simulation of Brownian motion affected by Gaussian force in gravitational field N83-32503

BUBBLES
Thermocapillary migration of bubbles in liquids showing relaxation of surface tension N83-31643
Bubble motion under reduced gravity N83-31644
A light-scattering system to measure cavitation nuclei: Analysis and calibration
[AD-A127946] N83-32589

BUCKLING
Design technology of advanced composites
[AD-A127892] N83-31735
Buckling of steel containment shells. Task 4: Use of the PANDA program for simple buckling analyses of stiffened cylindrical shells
[DE83-900980] N83-32115
Buckling of steel-containment shells. Task 1B: Buckling of Washington Public Power Supply Systems' plant no. 2 containment vessel
[DE83-901036] N83-32118

BUDGETING
Problems associated with the implementation of management control systems
[AD-A127254] N83-32658

BUILDINGS
Convection coefficients at building surfaces
[DE83-002572] N83-32015

BUOYANCY
Influence of surface tension minimum on surface and buoyancy driven flows in Stokes regime N83-31673
Buoyancy-thermocapillary convection: The role of interfacial deformation N83-31674
Investigation ofantic (61 deg 36'N, 13 deg 24'W)
[PB83-183806] N83-32275

BURNING RATE
Numerical simulation of turbulent flame and pressure development in gas explosions
[PB83-177832] N83-31790

BUS CONDUCTORS
Hardware and software implementation of an interface between the Unibus and the General Purpose Interface Bus
[AD-A127564] N83-32377

BUTT JOINTS
Effects of high heat input welding of construction steels A36, A514, and A516
[AD-A127083] N83-31820

BYPASSES
Shunt current control methods in electrochemical systems applications
[DE83-004015] N83-31769

C

CABIN ATMOSPHERES
CB agent threat to atmosphere inside Navy aircraft
[AD-A127882] N83-31587

CABLES
Equipment qualification research test of electrical cable with factor splices and insulation rework: Test no. 2, report no. 1
[DE83-002165] N83-31980

CADMIUM TELLURIDES
Large plate CdTe synthesis by sealed vessel transport
[AD-A127893] N83-32616

CALCIUM COMPOUNDS
Kinetics of the reduction of calcium sulfate with carbon monoxide and hydrogen
[DE83-004963] N83-31780

CALIBRATING
The challenge for metrology in the R&D environment
[DE83-003101] N83-31907
The NMR (Nuclear Magnetic Resonance) sensor for calibrating the field of a superconducting solenoid
[AD-A127997] N83-31973
Improving divider calibration techniques
[DE83-004061] N83-31988
Semiautomatic AC/DC thermal voltage converter calibration system
[PB83-180224] N83-32042
Self-study manual on optical radiation measurements. Part 3. Applications, chapter 1. Measurement of solar terrestrial spectral irradiance in the ozone cut-off region
[PB83-184382] N83-32231
Suitability of a wall-stabilized arc as a transfer standard of spectral radiance in the spectral range 165 to 350 nm
[NPL-QU-65] N83-32479
Response of a multi-element dosimeter to calibrated beta sources with E sub max from 0.23 to 3.5 MeV
[DE83-002013] N83-32532

CAMERAS
Design considerations for a high-spatial-resolution positron camera with dense-drift-space MWPC's
[DE83-003051] N83-32590

CANS
Corrosion resistant canisters for nuclear waste isolation
[DE83-000090] N83-32564
Disposal costs for SRP high-level wastes in borosilicate glass and crystalline ceramic waste forms
[DE83-003105] N83-32567
Assessment of spent-fuel waste-form/stabilizer alternatives for geologic disposal
[DE83-002458] N83-32573

CAPACITANCE
Composite coaxial telecommunications cable
[AD-A127810] N83-31969

CAPILLARY FLOW
Thermocapillary migration of bubbles in liquids showing relaxation of surface tension N83-31643
Bubble motion under reduced gravity N83-31644
Measurement of the critical Marangoni number in a floating zone under reduced gravity N83-31671
Buoyancy-thermocapillary convection: The role of interfacial deformation N83-31674
Numerical solutions of floating-zone thermocapillary flows N83-31675
An analysis of the driving forces in liquid phase sintering N83-31691

CAPTURE EFFECT
Physical basis for prompt-neutron activation analysis
[DE83-003938] N83-32559

CARBON
The aging of Co-20 percent Ni - 6.5 percent Nb alloy
[BLL-M-34951-(5828.4)] N83-31611
Thermodynamic functions of carbon solution in liquid nickel and cobalt
[BLL-M-34981-(5828.4)] N83-31616
Calculation of phase equilibrium of Si-O-C system in polynomial form: Communication 1
[BLL-M-34980-(5828.4)] N83-31617

CARBON DIOXIDE
Ecological consequences of a CO2-induced climatic change on forest ecosystems, volume 2, part 13
[DOE/EV-10019/13-VOL-2-PT-13] N83-32188
Research needed to determine the present carbon balance of northern ecosystems and the potential effect of carbon dioxide induced climate change
[DOE/EV-10019/14-VOL-2-PT-14] N83-32189
Risk estimates for CO exposure in man based on behavioral and physiological responses in rodents
[NASA-CR-166513] N83-32302

CARBON DIOXIDE LASERS
Coherent laser radar remote sensing
[AD-A127717] N83-32053

CARBON FIBER REINFORCED PLASTICS
Composites in ground test services --- aircraft manufacturing
[BAE-KGT-N-GEN-00999] N83-31729

CARBON FIBERS
Method and device for detection of a substance --- determining carbon fiber release in fire situations
[NASA-CASE-NPO-14940-1] N83-31954

CARBON MONOXIDE
Infrared spectra of CO adsorbed at low temperatures on Ni
[DE83-001568] N83-31765
Hydrogenation of carbon monoxide over ruthenium-rhenium on alumina catalysts
[DE83-004975] N83-31785
The effects of CO and HCN on pole-jump avoidance-escape behavior
[NASA-CR-166512] N83-32301

CARBON STEELS
Crystallography of lath martensite and stabilization of retained austenite
[DE83-003714] N83-31832
Design of strong, ductile, duplex low alloy steels
[DE83-002606] N83-31834
Lath martensites in low carbon steels
[DE83-002622] N83-31839

CARBURETORS
Engine performance comparison associated with carburetor icing during aviation grade fuel and automotive grade fuel operation
[DOT/FAA/CT-82/110] N83-31604

CARBURIZING
Development of a plasma carburizing process
[PB83-186692] N83-31913

CASCADE FLOW
Aeroelasticity in turbomachine-cascades
[AD-A127709] N83-31605

CAST ALLOYS
Integrally cast low-cost compressor
[AD-A127663] N83-31824

CASTING
Skin technology: Fundamentals and applications --- in space processing N83-31693
Integrally cast low-cost compressor
[AD-A127663] N83-31824

Use of sleeved rolls in a blooming mill
[BMFT-FB-T-83-042] N83-31908

CATALYSTS
Formulation and characterization of epoxy resin copolymer for graphite composites
[NASA-CR-166501] N83-31731
Ferrite catalyst
[DE83-0006514] N83-31762
Catalyst for exhaust-gas purification
[DE83-005019] N83-31770
Hydrogenation of carbon monoxide over ruthenium-rhenium on alumina catalysts
[DE83-004975] N83-31785

CATEGORIES
Taxonomy of tool features for the Ada (trade name) Programming Support Environment (APSE)
[PB83-179002] N83-32349

CATHODE RAY TUBES
The CRT display evaluation: The multidimensional rating of CRT-generated displays
[DE83-003699] N83-31979

CAUCHY PROBLEM
Characteristic Cauchy problems and solutions of formal power series N83-32335
A nonlinear integral equation occuring in a singular free boundary problem
[AD-A127940] N83-32413
An interface tracking algorithm for the porous medium equation
[AD-A127685] N83-32422

CAUSTICS (OPTICS)
Determination of stress-concentration factor by the caustic curves method
[BLL-M-34987-(5828.4)] N83-32086

CAVITATION FLOW
A light-scattering system to measure cavitation nuclei: Analysis and calibration
[AD-A127946] N83-32589

CAVITY RESONATORS
Electromagnetic Stirred Mode Cavities (SMCs) --- metrology
[NPL-DES-75] N83-31955

CEILINGS (METEOROLOGY)
An assessment of the AN/GMQ-13 cloud height set capability to meet AWS requirements
[AD-A127516] N83-32238
Regional weather depiction plot
[PB83-194415] N83-32258

CELLS (BIOLOGY)
Health effects of combustion-generated soot and polycyclic aromatic hydrocarbons: Human cell studies
[DE83-004578] N83-32196
Ideas on the unification of radiobiological theories
[DE83-004188] N83-32283

CEMENTS
Polymer concrete patching manual
[PB83-180265] N83-31912

CENTRAL NERVOUS SYSTEM STIMULANTS
Psychopharmacological techniques for optimizing human performances
[AD-A128529] N83-32309

CENTRIFUGAL FORCE
Bubble motion under reduced gravity N83-31644
Extraction and propagation of an intense rotating electron beam
[AD-A127018] N83-32523

CERAMIC COATINGS
Thermal barrier coating system having improved adhesion
[NASA-CASE-LEW-13359-01] N83-31855

CERAMICS
Analysis of gap heating due to stepped tiles in the shuttle thermal protection system
[NASA-TP-2209] N83-31713
Microstructural characterization of nuclear-waste ceramics
[DE83-000362] N83-31860
Contact noise in superionic ceramics
[AD-A127824] N83-31870
Effects of irradiation on ceramics for fusion-reactor applications
[DE83-009468] N83-31872
High-temperature corrosion of ceramics
[DE83-008763] N83-31873
Fireproof ceramics and process for their manufacture
[DE83-005021] N83-31881
Chemistry of glass-ceramic/metal bonding for header applications. 1: Effect of treatments on Inconel 718 and Hastelloy C-276 metallic surfaces --- on actuators and initiators
[DE83-003367] N83-32068
Disposal costs for SRP high-level wastes in borosilicate glass and crystalline ceramic waste forms
[DE83-003105] N83-32567

CEREBRAL CORTEX
Detection of retinal ischemia prior to blackout by electrical evoked cortical responses
[AD-A126855] N83-32288

CERIUM
Fermi-surface properties of CeSn-3 and related compounds
[DE83-008606] N83-32621

CERIUM COMPOUNDS
Fermi-surface properties of CeSn-3 and related compounds
[DE83-008606] N83-32621

CESIUM DIODES
Thermionic energy converters
[NASA-CASE-LEW-12443-1] N83-32175

CESIUM 137
Beta and low-energy photon irradiation of several commercial phosphors
[DE83-006606] N83-32531

CHALCOGENIDES
Halide and chalcogenide clusters of the early transition metals
[DE83-003792] N83-31841

CHANNEL FLOW
Analysis of gap heating due to stepped tiles in the shuttle thermal protection system
[NASA-TP-2209] N83-31713
Wall layer structure and drag reduction: Bursting rates
[AD-A128004] N83-32003

CHANNEL MULTIPLIERS
Study of the electric field inside microchannel plate multipliers
[DE83-003944] N83-31978

CHANNEL NOISE
Digital communications in spatially distributed interference channels
[AD-A127741] N83-31943

CHANNELS (DATA TRANSMISSION)
Space station needs, attributes and architecture options study technology development working group briefing
[NASA-CR-172949] N83-31716
Modem signature analysis
[AD-A127993] N83-31939
A collision resolution protocol with limited channel sensing: Finitely many users
[AD-A128501] N83-31948
Automated instrumentation system verification
[AD-A127775] N83-32030

CHARGE CARRIERS
Fundamental models of electronic transport in amorphous semiconductors
[DE83-000313] N83-32626

CHARGE COUPLED DEVICES
Use of nitrogen laser for observation of space-charge effects in drift chambers
[DE83-004416] N83-32065

CHARGE TRANSFER
Classical and semiclassical aspects of chemical dynamics
[DE83-0002024] N83-31766
Ion time-of-flight spectroscopy: Krypton charge-state spectra as a function of photon excitation energy near the K edge
[DE83-002221] N83-32550
Fabricate indium-antimonide two-dimensional charge injection device array
[AD-A127638] N83-32618

CHARGED PARTICLES
Charge correlations in deep inelastic proton-proton interactions at the CERN ISR: The axial field spectrometer collaboration
[DE83-002324] N83-32539

CHARPY IMPACT TEST
Reconstituted Charpy impact specimens
[DE83-901113] N83-32113

CHEBYSHEV APPROXIMATION
Solution of systems of complex linear equations in the L infinity norm with constraints on the unknowns
[AD-A127883] N83-32410

CHEMICAL ANALYSIS
System for monitoring physical characteristics of fluids
[NASA-CASE-NPO-15400-1] N83-31993
Holographic methods for the investigation of photophysical properties
[AD-A128510] N83-32032

CHEMICAL BONDS
Kinetics and mechanisms of the reactions of aliphatic free radicals with organocobaloximes and fluoropentaamminecobalt (III) ion and of iron (III) with methyrodoxime
[DE83-004856] N83-31779
The role of chemical bonding in adhesion
[AD-A127467] N83-31867
Electron and photon stimulated desorption: Benefits and pitfalls
[AD-A128239] N83-32527
Identification and cleavage of breakable single bonds by selecting oxidation, reduction and hydrolysis
[DE83-005312] N83-32624
The crystal and molcular structures of selected ruthenium (II) phosphate complexes and vinyl bromide-benzothiophene adducts
[DE83-004788] N83-32635

CHEMICAL COMPOSITION
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A127765] N83-31755
Kinetics of the reduction of calcium sulfate with carbon monoxide and hydrogen
[DE83-004963] N83-31780
Electric spark sensitivity profile of explosible/combustible systems
[PB83-177865] N83-31792
Study of the anomalous behavior of the electrical resistivity in alloys near the PrNi5.0 composition
[DE83-004787] N83-31847
Differential rain and snow scavenging efficiency implied by ionic concentration differences
[DE83-006304] N83-32245

CHEMICAL ELEMENTS
Laser-based instrumentation for the detection of chemical agents
[DE83-003538] N83-32036
Stopping powers and ranges of electrons and positrons
[PB83-175687] N83-32562

CHEMICAL ENGINEERING
Therymodynamic properties of strongly nonideal fluid mixtures from an xtended quasi-chemical theory
[DE83-004295] N83-32645

CHEMICAL EQUILIBRIUM
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A127765] N83-31755
Simultaneous determination of molar absorption coefficients and equilibrium constants for monomer-dimer equilibria
[AD-A128599] N83-31871

CHEMICAL LASERS
Energy disposal in electronically excited halogens and oxygen
[AD-A127585] N83-32051

CHEMICAL PROPERTIES
High-purity germanium crystal growing
[DE83-004181] N83-32632

CHEMICAL PROPULSION
The 1983 AFOSR/AFRPL Chemical Rocket Research Meeting
[AD-A127812] N83-31756
Computation of two-dimensional, transonic, chemically reacting nonequilibrium flow in a rocket nozzle N83-32487

CHEMICAL REACTIONS
Traveling-wave solutions to reaction-diffusion systems modeling combustion
[DE83-000603] N83-31773
Analysis of steady, 2-dimensional chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique. Volume 1: Theoretical development
[AD-A127219] N83-31997
Application of the ESCIMO theory to turbulent diffusion flames --- Engulfment, Stretching, Inter-diffusion and Moving Observer (ESCIMO)
[CFD/82/7] N83-32023

CHEMICAL REACTORS
LDEF experiments: Crystal growth by a solute diffusion process N83-31664

CHEMICAL WARFARE
CB agent threat to atmosphere inside Navy aircraft
[AD-A127882] N83-31587

CHEMISORPTION
Infrared spectra of CO adsorbed at low temperatures on Ni
[DE83-001568] N83-31765
Irreversible cooperative processes on lattices
[DE83-004795] N83-31878

CHIPS (ELECTRONICS)
Low cost harmonic analyser for the distribution network
[PB83-184697] N83-31992
Negative phase sequence recorder based on a single chip microcomputer
[PB83-184689] N83-32043
Fabricate indium-antimonide two-dimensional charge injection device array
[AD-A127638] N83-32618

CHIPS (MEMORY DEVICES)
Research in VLSI systems. Heuristic programming project and VLSI theory project: A fast turn around facility for Very Large Scale Integration (VLSI)
[AD-A127153] N83-31961

CHLORINATION
Hydrodesulfurization of chlorinized coal
[NASA-CASE-NPO-15304-1] N83-31743
CHROMATOGRAPHY
Advances in the SEC (Size Exclusion Chromatography) characterization of organometallic copolymers and copolymerization: Desorption of charged species by injected dilute acetic acid
[PB83-178681] N83-31789
CHROMIUM ALLOYS
Early stages of sulfidation of iron and iron-chromium alloy in hydrogen sulfide
[DE83-004969] N83-31837
CHROMIUM OXIDES
Fireproof ceramics and process for their manufacture
[DE83-005021] N83-31881
CHROMOSPHERE
Joint solar dynamics project data summary. Volume 1: Chromospheric and coronal observations
[PB83-175638] N83-32702
CIRCADIAN RHYTHMS
Circadian growth hormone and prolactin blood concentration during a self-limited viral infection and artificial hyperthermia in man
[AD-A127501] N83-32289
CIRCUIT BREAKERS
Fault-current limiter using a superconducting coil
[DE83-003557] N83-31986
CIRCUITS
Fault diagnosis of nonlinear analog circuits, volume 5. HAFDIC: A program for generating a hard fault dictionary
[AD-A127021] N83-31958
Composite coaxial telecommunications cable
[AD-A127810] N83-31969
IBEX foilles diode experiments
[DE83-009185] N83-31976
CIRCULAR PLATES
Simplified methods for the inelastic analysis and reliability assessment of stiffened shells --- for nuclear power plant containment vessels
[DE83-004966] N83-32100
CITIES
Preliminary evaluation of the ground-water-flow system in the Twin Cities metropolitan area, Minnesota
[PB83-174599] N83-32162
CLADDING
State of production of bimetals and prospects for its development
[BLL-M-35010-(5828.4)] N83-31800
CLASSIFICATIONS
Synthesis of hydroxy-terminated dinitropropyl acrylate polymers and improved characterization of hydroxy-terminated prepolymers
[AD-A127469] N83-31866
Classifying bugs is a tricky business N83-32365
Error taxonomy: What can be gained? N83-32366
Exponential approximations for two classes of aging distributions
[AD-A127924] N83-32463
CLAYS
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E83-10373] N83-32128
CLEARANCES
Control means for a gas turbine engine
[NASA-CASE-LEW-14586-1] N83-31603
CLIMATE
Petrosyants interviewed on results of PIGAP program N83-32124
Research needed to determine the present carbon balance of northern ecosystems and the potential effect of carbon dioxide induced climate change
[DOE/EV-10019/14-VOL-2-PT-14] N83-32189
Mesoscale climatology of cloud cover over Korea and Germany
[AD-A127521] N83-32237
Authorization for National Oceanic and Atmospheric Administration for fiscal years 1984 and 1985
[H-REPT-98-135-PT-1] N83-32682
CLIMATOLOGY
Natural landmarks survey of the islands of the Pacific
[PB83-182501] N83-32161
Mesoscale climatology of cloud cover over Korea and Germany
[AD-A127521] N83-32237
Terminal forecast reference notebook for Ramstein AB, Germany
[AD-A128319] N83-32240
Cloud physics studies in SCPP (Sierra Cooperative Pilot Project) during 1977-82 and in Utah/1978
[PB83-161307] N83-32248
Variability of precipitation in the Pacific Northwest: Spatial and temporal characteristics
[PB83-175232] N83-32249
Great Lakes precipitation by months, 1900-80
[PB83-175737] N83-32250
CLOSED CIRCUIT TELEVISION
Development of teleconferencing methodologies with emphasis on virtual space video and interactive graphics
[AD-A127738] N83-31935
CLOUD COVER
Cloud cover sensor
[NASA-CASE-NPO-14936-1] N83-32232
Mesoscale climatology of cloud cover over Korea and Germany
[AD-A127521] N83-32237
An assessment of the AN/GMQ-13 cloud height set capability to meet AWS requirements
[AD-A127516] N83-32238
CLOUD HEIGHT INDICATORS
An assessment of the AN/GMQ-13 cloud height set capability to meet AWS requirements
[AD-A127516] N83-32238
CLOUD PHYSICS
Interpretations of the OSCAR data for reactive-gas scavenging
[DE83-003597] N83-32195
Cloud physics studies in SCPP (Sierra Cooperative Pilot Project) during 1977-82 and in Utah/1978
[PB83-161307] N83-32248
CLOUDS
Snow reflectance from thematic mapper
[E83-10391] N83-32144
CLOUDS (METEOROLOGY)
Cloud water: An important vector of atmospheric deposition
[DE83-004646] N83-32244
CLUSTER ANALYSIS
Four pi physics with the plastic ball
[DE83-004190] N83-32556
CLUTCHES
An SEM analysis of bearing failure due to electrical arcing
[AD-A127827] N83-32071
CMOS
Ambient and cryogenic temperature testing of a 32-channel CMOS multiplexer
[NASA-TM-84385] N83-31957
COAL
Hydrodesulfurization of chlorinized coal
[NASA-CASE-NPO-15304-1] N83-31743
Systematic studies on coals of different deposits, including their mineral matter
[BMFT-FB-T-83-068] N83-32160
NO-x emissions from pulverized-coal arch-fired boilers
[DE83-901472] N83-32193
COAL GASIFICATION
Coal-gasification research studies
[DE83-006604] N83-31763
Fossil fuel gasification technical evaluation services
[PB83-195107] N83-31894
COAL UTILIZATION
Preliminary perspective on pure methanol fuel for transportation
[PB83-180232] N83-31892
Identification and cleavage of breakable single bonds by selecting oxidation, reduction and hydrolysis
[DE83-005312] N83-32624
COASTAL CURRENTS
Revised update and retrieval system for the calcofi oceanographic data file
[PB83-189464] N83-32675
COASTAL ECOLOGY
Alabama coastal region ecological characterization. Volume 1: Coastal bibliography
[PB83-180661] N83-32202
COASTAL WATER
Revised update and retrieval system for the calcofi oceanographic data file
[PB83-189464] N83-32675
COATINGS
Development of interim performance criteria for restoration coatings for porcelain enamel surfaces
[PB83-185553] N83-31884
Thermal coupling and damage mechanims of 1.06 micron laser radiation and laser-produced plasma on selected materials
[AD-A127608] N83-32045
Advanced inorganic separators for alkaline batteries and method of making the same
[NASA-CASE-LEW-13171-2] N83-32176
COAXIAL CABLES
Composite coaxial telecommunications cable
[AD-A127810] N83-31969
COBALT
Dependence of lattice spacings of the SmCo5 phase on quenching temperature
[BLL-M-34952-(5828.4)] N83-31804
Thermodynamic functions of carbon solution in liquid nickel and cobalt
[BLL-M-34981-(5828.4)] N83-31816
Permanent magnet undulators
[DE83-003590] N83-32511
COBALT COMPOUNDS
Kinetics and mechanisms of the reactions of aliphatic free radicals with organocobaloximes and fluoropentaamminecobalt (III) ion and of iron (III) with methyrodoxime
[DE83-004856] N83-31779
COBOL
Cost-benefit impact study on the adoption of the draft proposed revised X3.23 American National Standard Programming Language COBOL
[PB83-191098] N83-32395
CODE DIVISION MULTIPLE ACCESS
A time slot assignment algorithm for a TDMA packet radio network
[AD-A128545] N83-31947
CODING
General-purpose stepping motor-encoder positioning subsystem with standard asychronous serial-line interface
[DE83-004634] N83-31987
New syndrome decoding techniques for convolutional codes over GFq
[AD-A127955] N83-32432
COEFFICIENTS
Simultaneous determination of molar absorption coefficients and equilibrium constants for monomer-dimer equilibria
[AD-A128599] N83-31871
On subset selection procedures for the largest mean from normal populations having a common known coefficient of variation
[AD-A127136] N83-32461
COGNITION
The CRT display evaluation: The multidimensional rating of CRT-generated displays
[DE83-003699] N83-31979
COHERENCE
Coherence studies of geomagnetic fluctuations in the frequency range .05 to 10 Hz
[AD-A127708] N83-31936
COHERENT RADAR
Coherent laser radar remote sensing
[AD-A127717] N83-32053
COHESION
Mathematical representation of size and electronic factors
[DE83-004182] N83-32455
COLD ROLLING
Experimental determination of inter-lap pressure in coils of steel strip
[BLL-M-35006-(5828.4)] N83-32087
COLD WATER
A model of heat loss and thermoregulation for immersion in cold water
[AD-A127854] N83-32300
COLD WEATHER
Cold weather goggles. Part 5: Acceptable limits of optical distortion
[AD-A127657] N83-32315
COLD WORKING
Strain hardening of heavily cold-worked metals
[DE83-003544] N83-31840
COLLISIONAL PLASMAS
Charge correlations in deep inelastic proton-proton interactions at the CERN ISR: The axial field spectrometer collaboration
[DE83-002324] N83-32539
ZAPP: Z-pinch atomic physics program
[DE83-005390] N83-32606
COLLOCATION
On collocation schemes for quasilinear singularity perturbed boundary value problems
[AD-A127727] N83-32426
COLORADO RIVER (NORTH AMERICA)
Evaluation of water conservation techniques in the Upper Colorado River Basin
[PB83-175315] N83-32164
COMBAT
Combat maintenance concepts and repair techniques using shape memory alloys for fluid lines, control tubes and drive shafts
[AD-A127826] N83-31572
Combat performance evaluation of fighter aircraft: A suite of FORTRAN-IV programs based on energy manoeuverability theory
[AD-A128263] N83-31599
COMBUSTION
Preliminary investigation of aluminum combustion in air and steam
[AD-A128566] N83-31757

Turbulent combustion rate in a spark ignition engine: Some comparisons between model predictions and experiments
[DE83-003205] N83-31767
Hydrogen combustion in aqueous foams
[DE83-002534] N83-31775

COMBUSTION CHAMBERS
A study of factors affecting soot formation in a swirl-stabilized combustor
[AD-A128255] N83-31754
Electric spark sensitivity profile of explosible/combustible systems
[PB83-177865] N83-31792

COMBUSTION PHYSICS
Combustion experiments under microgravity N83-31665
Fundamental combustion experiments in microgravity N83-31666
Studies of experiments on droplet burning at reduced gravity N83-31667
Hydrogen combustion results from the Sandia intermediate-scale (VGES) tank and the Sandia critical-tube-diameter test facility
[DE83-018744] N83-31761
Influence of chamber length and equivalence ratio on flame propagation in a constant-volume duct
[DE83-002573] N83-31771
Oxyhydrogen ignition and flame propagation under cryogenic temperatures N83-32484

COMBUSTION PRODUCTS
A study of factors affecting soot formation in a swirl-stabilized combustor
[AD-A128255] N83-31754
Noise thermometry measurements in combustion processes
[AD-A127945] N83-31758
Investigation of axisymmetric buoyant turbulent diffusion flames: Turbulence properties and concentrations of major species
[PB83-175612] N83-31915
Holographic investigation of solid propellant combustion particulates
[AD-A127841] N83-32029

COMET HEADS
Discussion of Halley's comet projects N83-31625

COMET TAILS
Discussion of Halley's comet projects N83-31625

COMETS
Outer satellite atmospheres: Their nature and planetary interactions
[NASA-CR-172945] N83-32696

COMMUNICATION EQUIPMENT
Multifunction spread spectrum technology
[AD-A127045] N83-31929

COMMUNICATION NETWORKS
Development of teleconferencing methodologies with emphasis on virtual space video and interactive graphics
[AD-A127738] N83-31935
A time slot assignment algorithm for a TDMA packet radio network
[AD-A128545] N83-31947
The application of distributed system architectures for computer-based instructional systems in the Naval Education and Training Command
[AD-A127694] N83-32347

COMMUNICATION SATELLITES
DSCS 2 LLTWTA helix current anomaly
[AD-A128008] N83-31972
Low cost satellite for fast interactive graphics in a time-sharing environment
[PB83-187336] N83-32396

COMMUTATION
A new algorithm for the solution of optimal control commutative bilinear system
[RR-212] N83-32393

COMPACTING
Effects of snow compaction on water release and sediment yield, Bridger Bowl Ski Area, Gallatin County, Montana
[PB83-186445] N83-32174

COMPATIBILITY
Taxonomy of tool features for the Ada (trade name) Programming Support Environment (APSE)
[PB83-179002] N83-32349

COMPONENT RELIABILITY
Some generalizations of the renewal process
[AD-A127522] N83-32431
A class of multivariate new better than used processes
[AD-A127535] N83-32469

COMPOSITE MATERIALS
Study of fatigue durability of advanced composite materials under conditions of accelerated loading
[NASA-CR-166405] N83-31732
Fracture behavior of boron aluminum composites at room and elevated temperatures
[AD-A127492] N83-31737
The CAD/CAM handbook for polymer composite reliability, volume 2
[AD-A127721] N83-31864
CAD/CAM handbook for polymer composite reliability, volume 1
[AD-A127720] N83-31865

COMPOSITE STRUCTURES
Wind tunnel experiments on the divergence of swept wings with composite structures
[AD-A127950] N83-31582

COMPRESSED GAS
Decision models for conducting an economic analysis of alternative fuels for the ice engine
[AD-A127954] N83-31887

COMPRESSIBILITY
Fuel conservation evaluation of US Army helicopters. Part 5: AH-1S slight testing
[AD-A128532] N83-31601
Shock compression of single-crystal forsterite N83-32614

COMPRESSIBLE FLUIDS
Traveling-wave solutions to reaction-diffusion systems modeling combustion
[DE83-000603] N83-31773

COMPRESSION LOADS
Fixture for environmental exposure of structural materials under compression load
[NASA-CASE-LAR-12602-1] N83-32081

COMPRESSOR BLADES
Control means for a gas turbine engine
[NASA-CASE-LEW-14586-1] N83-31603

COMPRESSOR ROTORS
Integrally cast low-cost compressor
[AD-A127663] N83-31824

COMPRESSORS
Integrally cast low-cost compressor
[AD-A127663] N83-31824
Cycling Joule Thomson refrigerator
[NASA-CASE-NPO-15251-1] N83-31897

COMPUTATION
Grid network generation with adaptive boundary points for projectiles at transonic speed
[AD-A128041] N83-31584
Computer program analysis of helicopter weight estimate relationships utilizing parametric equations
[AD-A128590] N83-31600
Synthetic seismogram modeling
[AD-A128305] N83-32218
A result on the computational complexity of heuristic estimates for the A algorithm
[AD-A127901] N83-32411
On polynomial approximation in the uniform norm by the discrete least squares method
[AD-A127693] N83-32420
A two-level pipelined systolic array for multi-dimensional convolution
[AD-A127544] N83-32434
Transverse and quantum effects in superfluorescence: Pump dynamics for three-level superfluorescence; An algorithm for transverse, full transient effects in optical bistability in a Fabry-Perot cavity
[AD-A127502] N83-32584

COMPUTATIONAL FLUID DYNAMICS
Improved method for transonic airfoil design-by-optimization
[NASA-CR-166497] N83-31578
The breaking of axisymmetric noncylindrical liquid bridges N83-31678
Proceedings of the Symposium on Mechanics for Space Flight
[ISAS-SP-1] N83-32480
Generation of orthogonal, boby-fitted grids using potential flow solution by the panel method N83-32485

COMPUTATIONAL GRIDS
Bivariate cardinal interpolation by splines on a three-direction mesh
[AD-A127939] N83-32412

COMPUTER AIDED DESIGN
Combat performance evaluation of fighter aircraft: A suite of FORTRAN-IV programs based on energy manoeuverability theory
[AD-A128263] N83-31599
Design of a multivariable tracker control law for the A-7D Digitac 2 aircraft
[AD-A127440] N83-31607
The CAD/CAM handbook for polymer composite reliability, volume 2
[AD-A127721] N83-31864
CAD/CAM handbook for polymer composite reliability, volume 1
[AD-A127720] N83-31865
Computer-aided design and fabrication of molds and computer control of injection molding
[PB83-187955] N83-31914
Structures and Dynamics Division: Research and technology plans for FY 1983 and accomplishments for FY 1982
[NASA-TM-85661] N83-32095
Optimum design of stiffened plates using the finite element method
[AD-A128556] N83-32110
A study of computer-aided geometric optical design
[AD-A127438] N83-32345
An application of a computer optical design program
[AD-A127857] N83-32375
Force method optimization II. Volume 2: User's manual
[AD-A128235] N83-32387
Force method optimization 2. Volume 1: Theoretical development
[AD-A127073] N83-32408

COMPUTER AIDED MANUFACTURING
The CAD/CAM handbook for polymer composite reliability, volume 2
[AD-A127721] N83-31864
CAD/CAM handbook for polymer composite reliability, volume 1
[AD-A127720] N83-31865
Flexible manufacturing system handbook. Volume 1: Executive summary
[AD-A127927] N83-31899
Flexible manufacturing system handbook. Volume 3: Buyer/user's guide
[AD-A127929] N83-31901

COMPUTER ASSISTED INSTRUCTION
An overview of artificial intelligence-based teaching aids
[AD-A127702] N83-32400

COMPUTER DESIGN
Distributed multiport memory architecture
[NASA-CASE-NPO-15342-1] N83-32342

COMPUTER GRAPHICS
Expansion of the scan endgame program for aircraft survivability studies and development of a supporting user's guide
[AD-A127557] N83-31598
Computerized ultrasonic scanning bridge for defect imaging: Composite materials
[DE83-001539] N83-31741
Computer aided design and production system for sequence controllers of machine tools (MARCS)
[PB83-179135] N83-31910
Interactive graphics package for the MEGATEK 7250 terminal of the seismic analysis station at the Centre for Seismic Studies
[AD-A127866] N83-32210
Experiences and perspectives with SRI's tools for software design and validation N83-32361
Design Aids for Real-Time Systems (DARTS) N83-32363
Interactive graphics package to facilitate a comparison of data with statistical distributions
[AD-A127147] N83-32372
Low cost satellite for fast interactive graphics in a time-sharing environment
[PB83-187336] N83-32396
Iterative noise elimination preliminary report
[AD-A127756] N83-32519
Dual 7 pinhole tomography
[DE83-004589] N83-32591

COMPUTER NETWORKS
A collision resolution protocol with limited channel sensing: Finitely many users
[AD-A128501] N83-31948
Distribution of functionality and levels of functionality as a solution to the CONOPS problem
[AD-A127651] N83-32379
Network management research
[AD-A127667] N83-32398
Magnetic fusion energy and computers. The role of computing in magnetic fusion energy research and development
[DE83-006565] N83-32539

COMPUTER PROGRAM INTEGRITY
A survey of software quality assurance methods and an evaluation of software quality assurance at Fleet Material Support Office
[AD-A127676] N83-32378

COMPUTER PROGRAMMING
Wellborne inertial navigation system
[DE83-004012] N83-31593
A data base processor semantics specification package
[NASA-CR-172172] N83-32352

Evaluating software development by analysis of changes: The data from the software engineering laboratory
[NASA-TM-85394] N83-32353
Glossary of software engineering laboratory terms
[NASA-TM-85395] N83-32354
Recommended approach to sofware development
[NASA-TM-85396] N83-32355
When and how to use a software reliability model
N83-32359
Software prototyping in the Software Engineering Laboratory N83-32360
Experiences and perspectives with SRI's tools for software design and validation N83-32361
Software Engineering Laboratory (SEL). Data base organization and user's guide, revision 1
[NASA-TM-85397] N83-32369
Configuration Analysis Tool (CAT). System Description and users guide (revision 1)
[NASA-TM-85398] N83-32370
Software Engineering Laboratory (SEL) Data Base Maintenance System (DBAM) user's guide and system description
[NASA-TM-85399] N83-32371
A deductive approach to the debugging, verification and modification of programs
[AD-A127900] N83-32373
A case study in writing efficient programs
[AD-A127572] N83-32376
The development of a programming support system for rapid prototyping
[AD-A128251] N83-32386
Organizational structure considerations for software development projects
[AD-A127061] N83-32660
Roles of industry and the university in computer research and development
[PB83-192039] N83-32670

COMPUTER PROGRAMS
An experimental study of pressures on 60 deg Delta wings with leading edge vortex flaps
[NASA-CR-172833] N83-31576
Combat performance evaluation of fighter aircraft: A suite of FORTRAN-IV programs based on energy manoeuverability theory
[AD-A128263] N83-31599
Computer program analysis of helicopter weight estimate relationships utilizing parametric equations
[AD-A128590] N83-31600
A lateral-directional controller for high-angle-of-attack flight
[AD-A128579] N83-31609
Tonopah Test Range capabilities: Technical manual
[DE83-005362] N83-31709
Computerized ultrasonic scanning bridge for defect imaging: Composite materials
[DE83-001539] N83-31741
Influence of chamber length and equivalence ratio on flame propagation in a constant-volume duct
[DE83-002573] N83-31771
Irreversible cooperative processes on lattices
[DE83-004795] N83-31878
Flexible manufacturing system handbook. Volume 1: Executive summary
[AD-A127927] N83-31899
Flexible manufacturing system handbook. Volume 4. Appendices
[AD-A127930] N83-31902
Technology for energy-efficient buildings
[DE83-005927] N83-31905
Calculation of the shielding effect of solid shell enclosures
[AWRE-O18/82] N83-31920
Fault diagnosis of nonlinear analog circuits, volume 5. HAFDIC: A program for generating a hard fault dictionary
[AD-A127021] N83-31958
Versatile secondary trigger for a multi-detector system
[DE83-04414] N83-31982
Oak Ridge beam-analysis system
[DE83002587] N83-32035
Automated on-line L-edge measurement of SNM concentration for near-real-time accounting
[DE83-000666] N83-32039
Interactive graphics package for the MEGATEK 7250 terminal of the seismic analysis station at the Centre for Seismic Studies
[AD-A127866] N83-32210
Self-study manual on optical radiation measurements. Part 3. Applications, chapter 1. Measurement of solar terrestrial spectral irradiance in the ozone cut-off region
[PB83-184382] N83-32231
On computing instantaneous geocentric tides along satellite tracks, the NSWC STT program
[AD-A128568] N83-32264
Taxonomy of tool features for the Ada (trade name) Programming Support Environment (APSE)
[PB83-179002] N83-32349
Federal agencies could save time and money with better computer software alternatives
[GAO/AFMD-83-29] N83-32350
A PACER: A Monte Carlo time-dependent spectrum program for generating few-group diffusion-theory cross sections
[DE83-003779] N83-32351
An application of a computer optical design program
[AD-A127857] N83-32375
The software scene in the extraction of Eigenvalues from sparse matrices
[AD-A127972] N83-32381
Adaptation of computer program for Pourbaix diagrams to personal computers
[AD-A128259] N83-32385
The development of a programming support system for rapid prototyping
[AD-A128251] N83-32386
SESAME '83: Report on the Los Alamos equation-of-state library
[DE83-008283] N83-32388
Deriving metrics for relating complexity measures to software maintenance costs
[DE83-000672] N83-32390
Computer program abstract as software documentation
[DE83-007570] N83-32391
Electronics Engineering Department Computer Program Newsletter no. 8: Image-Processing Computer Codes
[DE83-007768] N83-32392
Basic utility graphics software for the Hewlett-Packard 9845B desktop computer
[PB83-175760] N83-32394
Numerical Aerodynamic Simulation (NAS)
[NASA-TM-84386] N83-32397
Computation of two-dimensional, transonic, chemically reacting nonequilibrium flow in a rocket nozzle
N83-32487
Couette flow in continuum to free molecular regime
N83-32493
Development of practical MO techniques for prediction of the properties and behavior of materials
[AD-A127029] N83-32524
Formation energy of point defects in free surfaces and grain boundaries in MgO
[DE83-008524] N83-32622
Historical inflation program. A computer program generating historical inflation indices for Army aircraft, revision
[AD-A127674] N83-32677

COMPUTER STORAGE DEVICES
Distributed multiport memory architecture
[NASA-CASE-NPO-15342-1] N83-32342

COMPUTER SYSTEMS DESIGN
Automation in the workplace, its impact on the labor force, and the role of labor market planning for policymaking N83-32312
Distribution of functionality and levels of functionality as a solution to the CONOPS problem
[AD-A127651] N83-32379
An approach for implementing a microcomputer based report origination system in the Ada programming language
[AD-A128028] N83-32383
Network management research
[AD-A127667] N83-32398
The cooling unit for the closed box N83-32507
Better use of information technology can reduce the burden of federal paperwork
[GAO/GGD-83-39] N83-32655
Roles of industry and the university in computer research and development
[PB83-192039] N83-32670

COMPUTER SYSTEMS PERFORMANCE
Distribution of functionality and levels of functionality as a solution to the CONOPS problem
[AD-A127651] N83-32379

COMPUTER SYSTEMS PROGRAMS
Evaluating software development by analysis of changes: The data from the software engineering laboratory
[NASA-TM-85394] N83-32353
Proceedings of the Seventh Annual Software Engineering Workshop
[NASA-TM-85400] N83-32356
What have we learned in the past 6 years? Measuring software development technology N83-32357
Software errors and complexity: An empirical investigation N83-32358
Software Engineering Laboratory (SEL) Data Base Maintenance System (DBAM) user's guide and system description
[NASA-TM-85399] N83-32371

COMPUTER TECHNIQUES
Development of the MICROSAS longitudinal flight control system for the augmentor wing aircraft
[AD-A128331] N83-31608
A lateral-directional controller for high-angle-of-attack flight
[AD-A128579] N83-31609
Reconstruction by multidirectional holographic interferometry of the concentration field in a supersaturated solution near a growing NaClO3 crystal N83-31660
Development of data-acquisition-and-analysis systems for in-beam gamma-ray spectroscopy: A study of the nucleus 180W
[DE83-004992] N83-31781
Some effects of stress on users of a voice recognition system: A preliminary inquiry
[AD-A128559] N83-31944
A preliminary analysis of human factors affecting the recognition accuracy of a discrete word recognizer for C3 systems
[AD-A128546] N83-31946
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 7: Built-In Testing (BIT) and Built-In Test Equipment (BITE)
[AD-A128587] N83-31975
Semiautomatic AC/DC thermal voltage converter calibration system
[PB83-180224] N83-32042
Computer analysis for dynamic response of beams and plates on elastic foundations
[AD-A127504] N83-32105
Application of MSS/LANDSAT images to the structural study of recent sedimentary areas: Campos Sedimentary Basin, Rio de Janeiro, Brazil
[E83-10385] N83-32138
Ocean floor geomagnetic data collection system
[AD-A127618] N83-32260
Computational introspection
[AD-A127132] N83-32399
The cooling unit for the closed box N83-32507
Computer optical fiber data transmission system
[AD-A127724] N83-32585
Keywork-in-context index to computers in dentistry
[PB83-186361] N83-32674

COMPUTER VISION
Binocular shading and visual surface reconstruction
[AD-A127058] N83-32580
Intelligent interpretation of 3-D imagery
[AD-A127710] N83-32583

COMPUTERIZED SIMULATION
Design of a multivariable tracker control law for the A-7D Digitac 2 aircraft
[AD-A127440] N83-31607
Turbulent combustion rate in a spark ignition engine: Some comparisons between model predictions and experiments
[DE83-003205] N83-31767
Brownian-dynamics computer simulations of one dimensional polymer model. 1: Simple potentials
[DE83-002468] N83-31877
Interactive graphics package for the MEGATEK 7250 terminal of the seismic analysis station at the Centre for Seismic Studies
[AD-A127866] N83-32210
Accurate, practical simulation of satellite infrared radiometer spectral data
[DE83-002506] N83-32221
System analysis for the Huntsville Operational Support Center distributed computer system
[NASA-CR-170840] N83-32344
Computer-simulation studies of grain boundary systems and molecular solids
[AD-A127545] N83-32382
Numerical Aerodynamic Simulation (NAS)
[NASA-TM-84386] N83-32397
A random tour process of known length between known end points
[AD-A128243] N83-32441
Eulerian-Lagrangian relationships in Monte Carlo simulations of turbulent diffusion
[DE83-003490] N83-32453
Design considerations for a high-spatial-resolution positron camera with dense-drift-space MWPC's
[DE83-003051] N83-32590
Building and operating the logistics composite model (LCM) for new weapon systems, part A
[AD-A127538] N83-32662

CONCENTRATION
Ion-bombardment effects on the fatigue life of stainless steel under simulated fusion first-wall conditions
[DE83-007145] N83-31827

CONCENTRATION (COMPOSITION)
Investigation of axisymmetric buoyant turbulent diffusion flames: Turbulence properties and concentrations of major species
[PB83-175612] N83 31915

CONCENTRIC SPHERES
Method and apparatus for producing gas-filled hollow spheres --- target pellets for inertial confinement fusion
[NASA-CASE-NPO-14596-3] N83-31896
CONCRETE STRUCTURES
Polymer concrete patching manual
[PB83-180265] N83-31912
CONCRETES
Calculation of, and research into, the particulars of the current of guniting material flowing through a lance nozzle
[BLL-M-34993-(5828.4)] N83-31728
An economic analysis of alternative paving materials
[AD-A127534] N83-31903
Application of a third-invariant plasticity theory to concrete and soils
[AD-A127079] N83-32097
CONDENSATION
Studies on condensation heat transfer in two-phase closed thermosyphons N83-32505
CONDENSING
Low-pressure transfer operations
[DE83-003443] N83-32011
Flow field visualization of vapor condensation in the enclosure N83-32504
CONDUCTION ELECTRONS
Composition and electrical property relationships in polycrystalline inorganic materials
[AD-A127458] N83-31750
CONFERENCES
Materials Sciences Under Microgravity -- conferences
[ESA-SP-191] N83-31637
Gordon Research Conference in Organometar Chemistry
[AD-A127055] N83-31725
The 1983 AFOSR/AFRPL Chemical Rocket Research Meeting
[AD-A127812] N83-31756
Topical Meeting on Laser Techniques for Extreme Ultraviolet Spectroscopy
[AD-A127044] N83-32048
Interaction Between Objective Analysis and Initialization. Proceedings of the 14th Stanstead Seminar
[PB83-186890] N83-32256
Proceedings of the Seventh Annual Software Engineering Workshop
[NASA-TM-85400] N83-32356
Proceedings of the Symposium on Mechanics for Space Flight
[ISAS-SP-1] N83-32480
The 4th Symposium on Applied Surface Analysis: Parts 1 and 2
[AD-A127109] N83-32615
CONFIDENCE LIMITS
On confidence intervals for cyclic regenerative processes
[AD-A127761] N83-32444
CONFORMAL MAPPING
The theorem of semi-proper complexification N83-32332
On condition (a sub f) of a stratified mapping N83-32336
CONGRESSIONAL REPORTS
Oversight of the UNISPACE Conference
[GPO-14-255] N83-31633
Water conservation: An update of federal activity N83-32148
Global trends in population and resources
[GPO-96-841] N83-32149
Information on ocean disposal of municipal and industrial waste
[GAO/RCED-83-161] N83-32190
Urea-formaldehyde foam insulation
[GPO-12-485] N83-32191
Deforestation: Environmental impact and research needs
[GPO-12-976] N83-32192
Measures to address the impact of computer technology on lesser developed countries
[GPO-99-819] N83-32343
Federal agencies could save time and money with better computer software alternatives
[GAO/AFMD-83-29] N83-32350
Regional low-level radioactive waste disposal sites: Progress being made but new sites will probably not be ready by 1986
[GAO/RCED-83-48] N83-32563
Status of DOE's implementation of the magnetic fusion energy engineering act of 1980
[GAO/RCED-83-105] N83-32594
Better use of information technology can reduce the burden of federal paperwork
[GAO/GGD-83-39] N83-32655
Implementing the Paperwork Reduction Act: Some progress, but many problems remain
[GAO/GGD-83-35] N83-32656
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984
[S-REPT-98-152] N83-32678
National Aeronautics and Space Administration research and development N83-32679
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-32680
Space flight, control and data communications N83-32681
Authorization for National Oceanic and Atmospheric Administration for fiscal years 1984 and 1985
[H-REPT-98-135-PT-1] N83-32682
Department of Energy Civilian Research and Development Authorization Act for fiscal year 1984
[H-REPT-98-81] N83-32683
Authorizing appropriations to the National Science Foundation
[H-REPT-98-73] N83-32684
Technical Information Clearinghouse Fund Act of 1983
[H-REPT-98-94] N83-32685
Technology and handicapped people
[GPO-12-921] N83-32686
CONICAL BODIES
Measured characteristics of multi-gap loop and asymptotic conical dipole electromagnetic field sensors
[AD-A127817] N83-31974
An analysis of conical indentation of an elastic/perfectly plastic half-space by nonlinear finite element techniques
[AD-A127529] N83-32104
CONSERVATION LAWS
Conservation laws for liquid bridges N83-31677
CONSTANTS
Simultaneous determination of molar absorption coefficients and equilibrium constants for monomer-dimer equilibria
[AD-A128599] N83-31871
CONSTRAINTS
Exponential approximations for two classes of aging distributions
[AD-A127924] N83-32463
CONSTRUCTION
Evaluation of design criterion of the strategic expeditionary landing field
[AD-A128323] N83-31614
CONTACT POTENTIALS
Contact-potential and surface-charge effects in atmospheric-electrical instrumentation
[NASA-CR-172834] N83-32027
CONTAINERLESS MELTS
Containerless high temperature property measurements by atomic fluorescence
[NASA-CR-170835] N83-32522
CONTAINMENT
Electromagnetic mirror dynamics
[AD-A127515] N83-31938
Simplified methods for the inelastic analysis and reliability assessment of stiffened shells --- for nuclear power plant containment vessels
[DE83-004966] N83-32100
Buckling of steel containment shells. Task 4: Use of the PANDA program for simple buckling analyses of stiffened cylindrical shells
[DE83-900980] N83-32115
Buckling of steel-containment shells. Task 1B: Buckling of Washington Public Power Supply Systems' plant no. 2 containment vessel
[DE83-901036] N83-32118
CONTINENTAL SHELVES
Global analysis of the shallow geology of large-scale ocean slopes
[AD-A128208] N83-32267
CONTINUUM MECHANICS
Computer-aided design and fabrication of molds and computer control of injection molding
[PB83-187955] N83-31914
CONTROL BOARDS
The role of a mental model in learning to operate a device
[AD-A127281] N83-32305
CONTROL RODS
Heat transfer to water from a vertical tube bundle under natural-circulation conditions
[DE83-008459] N83-32010
CONTROL STABILITY
Plant step data and gain estimates in the robust feedback tuning regulator problem
[RR-211] N83-31991
Robustness with simultaneous pole and zero movement across the j-omega axis
[OUEL-1465/83] N83-32404
Robust sampled regulators for stable systems from plant step data
[RR-213] N83-32459
CONTROL SURFACES
Investigation of limit cycle response of aerodynamic surfaces with structural nonlinearities
[AD-A127140] N83-31580
CONTROL THEORY
Actuator-placement considerations for the control of large space structures
[AD-A128241] N83-31720
Plant step data and gain estimates in the robust feedback tuning regulator problem
[RR-211] N83-31991
The algebraic Riccati equation: A summary review of some available results --- optimal control problems
[NPL-DITC-23/83] N83-32405
CONTROL VALVES
Control means for a gas turbine engine
[NASA-CASE-LEW-14586-1] N83-31603
CONTROLLERS
Robust sampled regulators for stable systems from plant step data
[RR-213] N83-32459
Simple model order reduction by truncation with performance verification by fast digital simulation
[RR-217] N83-32460
CONVECTION
Calculation of turbulent convective heat exchange in a cylindrical channel with a sudden expansion: Communication 2
[BLL-M-34991-(5828.4)] N83-31995
Low level convergence and the prediction of convective precipitation
[AD-A127673] N83-32236
An analysis of a finite element method for convection-diffusion problems. Part 2: A posteriori error estimates and adaptivity
[AD-A128261] N83-32439
An analysis of a finite element method for convection-diffusion problems. Part 1: Quasi-optimality
[AD-A128260] N83-32440
CONVECTIVE FLOW
Stationary and oscillatory instabilities for mixture subjected to Soret effect in vertical cylinder with axial temperature gradient N83-31661
Investigation of convective flows in model systems of directional solidification configurations N83-31682
CONVECTIVE HEAT TRANSFER
The influence on the Marangoni effect of a surface tension minimum as a function of temperature in microgravity conditions N83-31669
Convective heat transfer in buildings: Recent research results
[DE83-015706] N83-32017
CONVERGENCE
On polynomial approximation in the uniform norm by the discrete least squares method
[AD-A127693] N83-32420
On a problem concerning spacings
[AD-A128509] N83-32449
A decomposition of the Beta distribution, related order and asymptotic behavior
[AD-A127815] N83-32474
CONVERSION
Notes on the conversion of logLisp from Rutgers/UCI-Lisp to interLisp
[AD-A127718] N83-32380
CONVEYORS
Acoustic system for material transport
[NASA-CASE-NPO-15453-1] N83-32515
CONVOLUTION INTEGRALS
A two-level pipelined systolic array for multi-dimensional convolution
[AD-A127544] N83-32434
COOLANTS
Heat transfer to water from a vertical tube bundle under natural-circulation conditions
[DE83-008459] N83-32010
COOLING
Metabolic and vascomotor insulative responses occurring on immersion in cold water
[AD-A128021] N83-32296
A model of heat loss and thermoregulation for immersion in cold water
[AD-A127854] N83-32300
COOLING SYSTEMS
The cooling unit for the closed box N83-32507
COORDINATE TRANSFORMATIONS
The germs of diffeomorphisms and of vector fields in the class of finite differentiability N83-32338
COPOLYMERS
Formulation and characterization of epoxy resin copolymer for graphite composites
[NASA-CR-166501] N83-31731
COPPER
Measurements of diffusion coefficient of copper in liquid lead in microgravity by the grain boundary grooving technique N83-31684

COPPER COMPOUNDS
Metallic composite materials and microgravity
N83-31641
CORN
Comparison of CRD, APU, and state models for Iowa corn and soybeans and North Dakota barley and spring wheat
[E83-10379] N83-32132
CORONARY ARTERY DISEASE
Balanced subclassification in observational studies using the propensity score: A case study
[AD-A127760] N83-32473
CORONARY CIRCULATION
Balanced subclassification in observational studies using the propensity score: A case study
[AD-A127760] N83-32473
CORONAS
The effects of corona and angle of arrival on the EMP response of cables lying on the surface of the Earth
[AD-A127060] N83-31928
CORRELATION
Analysis of gap heating due to stepped tiles in the shuttle thermal protection system
[NASA-TP-2209] N83-31713
Convection coefficients at building surfaces
[DE83-002572] N83-32015
Liquid transfer and entrainment correlation for droplet-annular flow
[DE83-007703] N83-32019
CORRELATORS
A theoretical model for the Speech Input Device SMD3. Part 2: Correlators
[NPL-DITC-21/83-PT-2] N83-31922
Multifunction spread spectrum technology
[AD-A127045] N83-31929
CORROSION
High-temperature corrosion of ceramics
[DE83-008763] N83-31873
European Scientific Notes, volume 37, number 1
[AD-A126961] N83-32672
CORROSION PREVENTION
Achievements and advanced methods of protection of metal and metal articles from corrosion
[BLL-M-34975-(5828.5)] N83-31815
Review of corrosion inhibitors: Theory and practice
[PB83-181487] N83-31853
CORROSION RESISTANCE
Analysis of experimental data on rolling of corrosion-resistant steel with hydraulic thrust
[BLL-M-35007-(5828.4)] N83-31806
Problem of corrosion-resistant steels
[BLL-M-26995-(5828.4)] N83-31810
Protective coatings for marine cables
[BLL-M-34971-(5828.4)] N83-31812
Achievements and advanced methods of protection of metal and metal articles from corrosion
[BLL-M-34975-(5828.5)] N83-31815
Early stages of sulfidation of iron and iron-chromium alloy in hydrogen sulfide
[DE83-004969] N83-31837
Corrosion resistant canisters for nuclear waste isolation
[DE83-000090] N83-32564
The 4th Symposium on Applied Surface Analysis: Parts 1 and 2
[AD-A127109] N83-32615
COSINE SERIES
Brownian-dynamics computer simulations of one dimensional polymer model. 1: Simple potentials
[DE83-002468] N83-31877
COSMIC RAYS
Cosmic ray effects on microelectronics. Part 2: The geomagnetic cutoff effects
[AD-A128601] N83-32703
COST ANALYSIS
Cost development of the dual-channel GPS (Global Positioning System) navigator for general aviation application
[AD-A127157] N83-31591
Energy conservation for housing: A workbook
[PB83-185330] N83-32186
POM (Program Objective Memorandum) FY-85 BP 1500 cost growth and leadtime adjustments: Research results
[AD-A128522] N83-32667
Historical inflation program. A computer program generating historical inflation indices for Army aircraft, revision
[AD-A127674] N83-32677
COST EFFECTIVENESS
An economic analysis of alternative paving materials
[AD-A127534] N83-31903
Indirect solar wind geothermal: Alternative energy sources 4, volume 4
[LC-82-71533] N83-32179
Cost-benefit impact study on the adoption of the draft proposed revised X3.23 American National Standard Programming Language COBOL
[PB83-191098] N83-32395
COST ESTIMATES
Cost development of the dual-channel GPS (Global Positioning System) navigator for general aviation application
[AD-A127157] N83-31591
Space station needs, attributes and architectural options study costing working group briefing
[NASA-CR-172950] N83-31717
Deriving metrics for relating complexity measures to software maintenance costs
[DE83-000672] N83-32390
Cost-benefit impact study on the adoption of the draft proposed revised X3.23 American National Standard Programming Language COBOL
[PB83-191098] N83-32395
Conceptual design report for a fusion engineering device
[DE83-002288] N83-32602
User's manual for training device cost model 'TRACOM'
[AD-A128355] N83-32664
User's manual for Cost Proposal Evaluation Program (CPEP)
[AD-A128356] N83-32665
Historical inflation program. A computer program generating historical inflation indices for Army aircraft, revision
[AD-A127674] N83-32677
COST REDUCTION
Implementing the Paperwork Reduction Act: Some progress, but many problems remain
[GAO/GGD-83-35] N83-32656
COUETTE FLOW
On the interpolation formula based upon the asymptotic solution to the kinetic model equation N83-32495
COULOMB COLLISIONS
Coulomb dissociation in relativistic heavy-ion reactions
[DE83-005004] N83-32557
COUPLED MODES
Mode specificity in unimolecular reaction dynamics
[DE83-0001932] N83-32546
COUPLERS
Optimized couplers between junction lasers and single-mode fibers
[AD-A128040] N83-32056
COUPLING
Inclusion of discrete-to-continuum coupling in multiphoton excitation and dissociation calculations
[NASA-CR-172836] N83-32529
COUPLINGS
Combat maintenance concepts and repair techniques using shape memory alloys for fluid lines, control tubes and drive shafts
[AD-A127826] N83-31572
CRACK GEOMETRY
Effect of microstructure on fatigue crack growth in duplex ferrite-martensite steels
[DE83-003715] N83-31833
CRACK INITIATION
Research on hot cracking in weld metal by melting-solidification heat cycle simulator
[PB83-178921] N83-32075
Dynamic fracture behavior of structural materials
[AD-A127902] N83-32101
CRACK PROPAGATION
On fatigue crack growth in a Ti-4, 5Al-5Mo-1.5Cr alloy with metastable beta-phase
[AD-A128048] N83-31825
Effect of microstructure on fatigue crack growth in duplex ferrite-martensite steels
[DE83-003715] N83-31833
Tear strength of elastomers under threshold conditions
[AD-A127006] N83-31857
Dynamic fracture behavior of structural materials
[AD-A127902] N83-32101
The brittle to ductile transition in polycrystalline ice under tension
[AD-A127701] N83-32102
Applications of energy-release-rate techniques to part-through cracks in experimental pressure vessels
[DE83-003486] N83-32112
X-ray topographic fractography of single crystals of molybdenum and niobium
[DE83-005066] N83-32642
CRACKS
Scattering by flaws in a slab or a half-space
[DE83-000637] N83-32080
CREEP ANALYSIS
Non-linear data fitting for analysis of friction stress and recovery in metal alloys
[NPL-DITC-13/82] N83-32093
CREEP PROPERTIES
High-temperature elastic-plastic and creep properties for SA533 Grade B Class I and SA508 materials
[DE83-901103] N83-32114
CRITICAL POINT
Critical point phenomena in fluids N83-31695
Adsorption behavior of pure fluids near the gas-liquid critical point N83-31697
Electrolyte solutions near the critical point of water: A review and proposal for studies under microgravity conditions N83-31698
CROP INVENTORIES
Simulation of meteorological satellite (METSAT) data using LANDSAT data
[E83-10381] N83-32134
Preliminary statistical studies concerning the Campos RJ sugar cane area, using LANDSAT imagery and aerial photographs
[E83-10384] N83-32137
CROSS FLOW
The trajectory of a heated, buoyant jet in a non-uniform cross-flow
[BAE-KAD-GEN-N-2868] N83-31994
CROSS SECTIONS
Cross-sectional transmission electron microscopy of semiconductors
[DE83-003662] N83-32627
CROSSINGS
The asymptotic variance of higher order crossings
[AD-A127459] N83-32430
CROSSLINKING
Equipment qualification research test of electrical cable with factor splices and insulation rework: Test no. 2, report no. 1
[DE83-002165] N83-31980
CROSSTALK
Ambient and cryogenic temperature testing of a 32-channel CMOS multiplexer
[NASA-TM-84385] N83-31957
Composite coaxial telecommunications cable
[AD-A127810] N83-31969
CRYOGENIC FLUIDS
Evaluation of outer race tilt and lubrication on ball wear and SSME bearing life reductions
[NASA-CR-170836] N83-32069
CRYOGENIC ROCKET PROPELLANTS
High speed cryogenic self-acting, shaft seals for liquid rocket turbopumps
[NASA-CR-168194] N83-32070
CRYOGENIC WIND TUNNELS
Development of a cryogenic windtunnel balance
[KB-TE-1-1173] N83-31611
CRYOGENICS
Supercooled water
[AD-A127539] N83-31753
Fracture toughness of polybutadiene at cryogenic temperatures
[AD-A126999] N83-31858
Weld-cracking mechanisms in austenitic stainless steels
[DE83-001157] N83-32111
Oxyhydrogen ignition and flame propagation under cryogenic temperatures N83-32484
CRYOPUMPING
Behaviour of a 6 m high thermosiphon — cryopumps
[OUEL-1460/83] N83-32514
CRYSTAL DEFECTS
Composition and electrical property relationships in polycrystalline inorganic materials
[AD-A127458] N83-31750
Development of narrow gap welding technology for extremely thick steel
[PB83-178913] N83-31909
CRYSTAL DISLOCATIONS
Lath martensites in low carbon steels
[DE83-002622] N83-31839
CRYSTAL GROWTH
Materials Sciences Under Microgravity — conferences
[ESA-SP-191] N83-31637
Isothermal gradient heat-pipes space furnace (500 to 1000 deg C) N83-31659
Numerical solutions of floating-zone thermocapillary flows N83-31675
Oscillatory convection in a spherical cavity due to g-jitter N83-31694
The main results of the space material science experiments within the framework of Intercosmos program N83-31700
Lath martensites in low carbon steels
[DE83-002622] N83-31839
Large plate CdTe synthesis by sealed vessel transport
[AD-A127893] N83-32616
The development and evaluation of point defect models for the growth of passive films on single crystal, polycrystalline, and amorphous metal surfaces
[AD-A128333] N83-32619

CRYSTAL LATTICES
Dependence of lattice spacings of the SmCo5 phase on quenching temperature
[BLL-M-34952-(5828.4)] N83-31804
Irreversible cooperative processes on lattices
[DE83-004795] N83-31878
Formation energy of point defects in free surfaces and grain boundaries in MgO
[DE83-008524] N83-32622
Ga(As,P) strained-layer super-lattices: A ternary semiconductor with independently adjustable band gap and lattice constant
[DE83-003917] N83-32634
The crystal and molcular structures of selected ruthenium (II) phosphate complexes and vinyl bromide-benzothiophene adducts
[DE83-004788] N83-32635
Data processing in neutron protein crystallography using positron-sensitive detectors
[DE83-005803] N83-32636
Doping and transport studies in In/sub x/Ga/sub 1-x/As/GaAs strained-layer superlattices
[DE83-003915] N83-32640
CRYSTAL STRUCTURE
The brittle to ductile transition in polycrystalline ice under tension
[AD-A127701] N83-32102
A general purpose residual stress analyzer
[AD-A127820] N83-32109
Structure of multi-layer spherical crystals of graphite in cast iron
[BLL-M-35028-(5828.4)] N83-32613
Structure and phase transitions of liquid crystals
[AD-A127573] N83-32617
The measurement of X-ray residual stress in textured cubic materials
[AD-A127822] N83-32620
CRYSTALLINITY
Influence of composition and substrate bias on structure and inert-gas content of sputter-deposited Ni-La alloys
[DE83-002716] N83-31830
CRYSTALLIZATION
Order of magnitude analysis of solute macrosegregation in crystal growth from the melt N83-31683
Experiments on crystallization of semiconductors aboard Salyut 6: Soyuz orbital complex N83-31688
Solidification front dynamics in model systems N83-31689
Nature of boride phases formed during crystallization of amorphous Fe-B alloys
[BLL-M-35036-(5828.4)] N83-31798
CRYSTALLOGRAPHY
Solidification front dynamics in model systems N83-31689
Crystallography of lath martensite and stabilization of retained austenite
[DE83-003714] N83-31832
Lath martensites in low carbon steels
[DE83-002622] N83-31839
Data processing in neutron protein crystallography using positron-sensitive detectors
[DE83-005803] N83-32636
CUBIC LATTICES
The measurement of X-ray residual stress in textured cubic materials
[AD-A127822] N83-32620
CUES
Binocular shading and visual surface reconstruction
[AD-A127058] N83-32580
CULTURE TECHNIQUES
Health effects of combustion-generated soot and polycyclic aromatic hydrocarbons: Human cell studies
[DE83-004578] N83-32196
CURING
Effect of the extent of cure on the modulus, glass transition, water absorption, and density of an amine-cure epoxy
[AD-A127090] N83-31859
CURRENT CONVERTERS (AC TO DC)
Semiautomatic AC/DC thermal voltage converter calibration system
[PB83-180224] N83-32042
Development and testing of a submersible motor pump driven by a solar cell generator
[BMFT-FB-T-83-081] N83-32074
CURRENT DENSITY
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia N83-32482
CURRENT DISTRIBUTION
Current analysis for rotating and vibrating heavy nuclei
[DE83-000612] N83-32637
CURRENT SHEETS
The inner edge of the plasma sheet and the diffuse aurora
[NASA-TM-85062] N83-32595
CURVES (GEOMETRY)
Etale covering of a Mumford curve N83-32331
Degree of the fibers of an elliptic fibration N83-32339
CUTTING
Rate and magnitude of deformation during cutting of plate materials
[BLL-M-34983-(5828.4)] N83-32088
CYANIDES
The effects of CO and HCN on pole-jump avoidance-escape behavior
[NASA-CR-166512] N83-32301
CYCLIC COMPOUNDS
Polycyclic high energy oxidizers
[AD-A128309] N83-31869
CYCLIC HYDROCARBONS
Polycyclic high energy oxidizers
[AD-A128309] N83-31869
Health effects of combustion-generated soot and polycyclic aromatic hydrocarbons: Human cell studies
[DE83-004578] N83-32196
CYCLONES
Tropical cyclone wind probability forecasting for the north Indian Ocean (WINDPIO)
[AD-A127130] N83-32233
Annual data and verification tabulation Atlantic tropical cyclones 1982
[PB83-184077] N83-32255
CYCLOTRON RESONANCE DEVICES
Gyrotron transmitting tube
[NASA-CASE-LEW-13429-1] N83-31952
CYLINDRICAL BODIES
Stationary and oscillatory instabilities for mixture subjected to Soret effect in vertical cylinder with axial temperature gradient N83-31661
CYLINDRICAL SHELLS
Simplified methods for the inelastic analysis and reliability assessment of stiffened shells — for nuclear power plant containment vessels
[DE83-004966] N83-32100
Buckling of steel containment shells. Task 4: Use of the PANDA program for simple buckling analyses of stiffened cylindrical shells
[DE83-900980] N83-32115

D

DAMAGE
Heat treating effects on environmental hydrogen embrittlement of nickel
[DE83-004921] N83-31844
DAMAGE ASSESSMENT
Structural element and real blade impact testing, volume 1
[AD-A127744] N83-31806
Thermal coupling and damage mechanims of 1.06 micron laser radiation and laser-produced plasma on selected materials
[AD-A127608] N83-32045
Force method optimization 2. Volume 1: Theoretical development
[AD-A127073] N83-32408
DAMPING
Alloy with enhanced damping properties
[BLL-M-34953-(5828.4)] N83-31805
Perturbation analysis of the limit cycle of the free van der Pol equation
[NASA-CR-172166] N83-32341
DATA ACQUISITION
Fuel conservation evaluation of US Army helicopters. Part 5: AH-1S slight testing
[AD-A128532] N83-31601
The GOES user's guide N83-31710
Development of data-acquisition-and-analysis systems for in-beam gamma-ray spectroscopy: A study of the nucleus 180W
[DE83-004992] N83-31781
Improving divider calibration techniques
[DE83-004061] N83-31988
Performance analysis of the Jersey City Total Energy Site
[PB83-185348] N83-32187
Workshop for the Winter Monsoon Experiment
[AD-A127989] N83-32239
ODAS-450 transmission regularity and meteorological data representativity
[PB83-183731] N83-32254
Ocean floor geomagnetic data collection system
[AD-A127618] N83-32260
Universal microcomputer interface for data acquisition
[AD-A127875] N83-32346
Evaluating software development by analysis of changes: The data from the software engineering laboratory
[NASA-TM-85394] N83-32353
What have we learned in the past 6 years? Measuring software development technology N83-32357
DATA BASE MANAGEMENT SYSTEMS
Software Engineering Laboratory (SEL) Data Base Maintenance System (DBAM) user's guide and system description
[NASA-TM-85399] N83-32371
DATA BASES
Computer Aided System for Developing Aircrew Training (CASDAT)
[AD-A128530] N83-31615
Relationship between manufacturing yields and field failure rates of electronic equipment
[AD-A128498] N83-32078
Workshop for the Winter Monsoon Experiment
[AD-A127989] N83-32239
Variability of precipitation in the Pacific Northwest: Spatial and temporal characteristics
[PB83-175232] N83-32249
Software Engineering Laboratory (SEL). Data base organization and user's guide, revision 1
[NASA-TM-85397] N83-32369
Distributing a database for parallelism
[AD-A127856] N83-32374
Quality assurance program for isotopic power systems
[DE83-005250] N83-32560
Interactive automated system for normalization of relations
[AD-A127496] N83-32673
DATA CORRELATION
A theoretical model for the Speech Input Device SMD3. Part 2: Correlators
[NPL-DITC-21/83-PT-2] N83-31922
Preliminary statistical studies concerning the Campos RJ sugar cane area, using LANDSAT imagery and aerial photographs
[E83-10384] N83-32137
DATA MANAGEMENT
Seismographic networks: Problems and outlook for the 1980's
[AD-A128032] N83-32215
Network management research
[AD-A127667] N83-32398
DATA PROCESSING
Estimation programs for dynamic flight test data analysis
[AD-A128527] N83-31585
LANDSAT data preprocessing
[E83-10380] N83-32133
Measures to address the impact of computer technology on lesser developed countries
[GPO-99-819] N83-32343
The application of distributed system architectures for computer-based instructional systems in the Naval Education and Training Command
[AD-A127694] N83-32347
Computer program abstract as software documentation
[DE83-007570] N83-32391
BAYR, a data association algorithm based on a Bayesian recursion
[AD-A127460] N83-32468
Uses of information discussed N83-32652
Streamlining flow of scientific and technical information N83-32653
DATA PROCESSING EQUIPMENT
Illinois I/O register to FASTBUS interface
[DE83-007330] N83-32389
DATA RECORDING
CNPQ/INPE LANDSAT system
[E83-10374] N83-32127
DATA REDUCTION
A hardware preprocessor for use in speech recognition: Speech Input Device SID3
[NPL-DITC-22/83] N83-31923
DATA SIMULATION
Simulation of meteorological satellite (METSAT) data using LANDSAT data
[E83-10381] N83-32134
DATA SMOOTHING
Iterative noise elimination preliminary report
[AD-A127756] N83-32519
DATA TRANSMISSION
Electronic technology (selected articles)
[AD-A127809] N83-31970
Automation of electric power system (selected articles)
[AD-A127839] N83-32055
ODAS-450 transmission regularity and meteorological data representativity
[PB83-183731] N83-32254
ODAD-451 data buoy in the north-east Atlantic (61 deg 36'N, 13 deg 24'W)
[PB83-183806] N83-32275
Computer optical fiber data transmission system
[AD-A127724] N83-32585

DC 10 AIRCRAFT
Advanced composite vertical stabilizer for DC-10 transport aircraft
[NASA-CR-172780] N83-31595
DEBRIS
Scaling laws for vortex induced debris ingestion into air intakes
[BAE-KRS-N-GEN-274] N83-31575
Heat-transfer characteristics of dry porous particulate beds with internal heat generation --- for reactor safety considerations N83-32012
DECAY RATES
Blast wave decay from an exploding hemispherical gas cloud
[PB83-177857] N83-32025
Report on solar-neutrino experiments
[DE83-001306] N83-32543
Mode specificity in unimolecular reaction dynamics
[DE83-0001932] N83-32546
DECISION MAKING
Summary of analysis of sources of forecasting errors in BP 1500 requirements estimating process and description of compensating methodology
[AD-A128548] N83-31574
Flight control center's history, functions spotlighted N83-31626
Generating capacity in US electric utilities: How is it used? How much is needed over the decade
[DE83-900733] N83-31990
Legal and administrative systems for water allocation and management: Options for change. Seven perspectives on aspects of water resource planning in the southeastern states
[PB83-187120] N83-32173
Option generation techniques for command and control
[AD-A127715] N83-32308
An artificial intelligence technique to generate self-optimizing experimental designs
[AD-A127764] N83-32402
DECISION THEORY
Option generation techniques for command and control
[AD-A127715] N83-32308
The entropic penalty approach to stochastic programming
[AD-A127920] N83-32462
DECODING
New syndrome decoding techniques for convolutional codes over GFq
[AD-A127955] N83-32432
DECOMPOSITION
Time resolved study of primary decomposition process for nitro paraffins and nitramines
[AD-A127660] N83-31748
Microbiological control of the aquatic weed Myriophyllum Spp
[PB83-181958] N83-32204
A decomposition of the Beta distribution, related order and asymptotic behavior
[AD-A127815] N83-32474
DEFECTS
Computerized ultrasonic scanning bridge for defect imaging: Composite materials
[DE83-001539] N83-31741
Densification kinetics of shock-activated nitrides
[DE83-003008] N83-31742
DEFLAGRATION
Traveling-wave solutions to reaction-diffusion systems modeling combustion
[DE83-000603] N83-31773
Blast wave decay from an exploding hemispherical gas cloud
[PB83-177857] N83-32025
DEFORESTATION
Deforestation: Environmental impact and research needs
[GPO-12-976] N83-32192
DEFORMATION
Influence of temperature-deformation conditions on mechanical properties of rolled plate after straightening
[BLL-M-26987-(5828.4)] N83-31809
Effects of microstructure on light ion irradiation creep in nickel
[DE83-003467] N83-31831
Strain hardening of heavily cold-worked metals
[DE83-003544] N83-31840
DELTA WINGS
An experimental study of pressures on 60 deg Delta wings with leading edge vortex flaps
[NASA-CR-172833] N83-31576
DENDRITIC CRYSTALS
The effect of the natural convection on the solidification of metallic alloys N83-31687
DENSIFICATION
Densification kinetics of shock-activated nitrides
[DE83-003008] N83-31742
DENSITOMETERS
Automated on-line L-edge measurement of SNM concentration for near-real-time accounting
[DE83-000666] N83-32039
DENSITY DISTRIBUTION
Effects of microstructure on light ion irradiation creep in nickel
[DE83-003467] N83-31831
Magnetic-resonance studies of reactively sputtered amorphous silicon-hydrogen alloys
[DE83-004958] N83-31842
Self-semilar solutions of hydrodynamic equations for expanding layer with boundary condition specified by differential equation N83-32481
DENSITY MEASUREMENT
Density measurements of a free jet by a laser differential interferometer N83-32497
DENTISTRY
Keywork-in-context index to computers in dentistry
[PB83-186361] N83-32674
DEPENDENT VARIABLES
Estimates of software size from state machine designs N83-32368
DEPLETION
F-atom depletion in NF3 combustor laser flows
[AD-A127075] N83-32047
DEPLOYMENT
ODAD-451 data buoy in the north-east Atlantic (61 deg 36'N, 13 deg 24'W)
[PB83-183806] N83-32275
DEPOSITION
Geology and engineering characteristics of selected low-permeability gas sands: A survey
[PB83-195099] N83-32230
Differential rain and snow scavenging efficiency implied by ionic concentration differences
[DE83-006304] N83-32245
DESIGN ANALYSIS
Evaluation of design criterion of the strategic expeditionary landing field
[AD-A128323] N83-31614
Relationship of an in-situ test facility to a deep geologic repository for high-level nuclear waste, task 4
[DE83-901818] N83-31726
Fossil fuel gasification technical evaluation services
[PB83-195107] N83-31894
Design and development testing of an improved high-efficiency water heater
[DE83-006136] N83-31904
Conceptual designs for 100-MW space radiators
[DE83-003542] N83-32020
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible
[AD-A128534] N83-32062
Robust sampled regulators for stable systems from plant step data
[RR-213] N83-32459
High-field superconducting window-frame beam-transport magnets
[DE83-004592] N83-32512
Design considerations for a high-spatial-resolution positron camera with dense-drift-space MWPC's
[DE83-003051] N83-32590
DESORPTION
Characterization of internal sales by laser desorption mass spectrometry
[AD-A127916] N83-31746
Advances in the SEC (Size Exclusion Chromatography) characterization of organometallic copolymers and copolymerization: Desorption of charged species by injected dilute acetic acid
[PB83-178681] N83-31789
Electron and photon stimulated desorption: Benefits and pitfalls
[AD-A128239] N83-32527
Localization of surface excitations and stimulated desorption
[DE83-002143] N83-32625
DESULFURIZING
Hydrodesulfurization of chlorinized coal
[NASA-CASE-NPO-15304-1] N83-31743
DEUTERIUM
Hydrogen and deuterium diffusion in vanadium alloys
[DE83-004964] N83-31845
DEUTERIUM COMPOUNDS
F-atom depletion in NF3 combustor laser flows
[AD-A127075] N83-32047
DEVELOPING NATIONS
Measures to address the impact of computer technology on lesser developed countries
[GPO-99-819] N83-32343
Bibliography of appropiate technology information for developing countries: Selected abstracts from the NTIS data file (Fourth Edition)
[PB83-113852] N83-32669
DEVIATION
Comparison of algorithms for computing generating-system reliability indexes
[DE83-901883] N83-32079
Least absolute deviations regression
[DE83-004424] N83-32456
DIAGNOSIS
Fault diagnosis of nonlinear analog circuits. Volume 4: An isolation algorithm for the analog fault dictionary
[AD-A127020] N83-31959
DIAGRAMS
Adaptation of computer program for Pourbaix diagrams to personal computers
[AD-A128259] N83-32385
DIAMETERS
Hydrogen combustion results from the Sandia intermediate-scale (VGES) tank and the Sandia critical-tube-diameter test facility
[DE83-018744] N83-31761
DIAMINES
Polymer intermediates from limonene
[BMFT-FB-T-83-053] N83-31882
DIAPHRAGMS (MECHANICS)
Preliminary engineering study: Quick opening valve MSFC high Reynolds number wind tunnel
[NASA-CR-170845] N83-31612
DICTIONARIES
Fault diagnosis of nonlinear analog circuits, volume 5. HAFDIC: A program for generating a hard fault dictionary
[AD-A127021] N83-31958
DIELECTRICS
Backscattering from anisotropic random media
[AD-A127873] N83-31933
DIESEL ENGINES
Emission characteristics of a medium-speed diesel using water-emulsified residual fluids
[DE83-001552] N83-32073
Performance analysis of the Jersey City Total Energy Site
[PB83-185348] N83-32187
DIESEL FUELS
Technical considerations in choosing alcohol fuels for less-developed countries
[DE83-004644] N83-31891
Emission characteristics of a medium-speed diesel using water-emulsified residual fluids
[DE83-001552] N83-32073
DIFFERENCE EQUATIONS
Systems of difference-differential equations N83-32334
DIFFERENTIAL CALCULUS
Noncanonical Hamiltonian formulation of ideal magnetohydrodynamics
[DE83-000649] N83-32603
DIFFERENTIAL EQUATIONS
Explicit smooth velocity kernels for vortex methods
[AD-A127781] N83-32007
Annals of the Fourier Institute, volume 33, number 1
[ISSN-0373-0956] N83-32329
Systems of difference-differential equations N83-32334
On collocation schemes for quasilinear singularity perturbed boundary value problems
[AD-A127727] N83-32426
Malliavin's calculus and stochastic integral representations of functionals of diffusion processes
[AD-A127726] N83-32427
Some aspects of critical point theory
[AD-A127757] N83-32446
Computational implementation of the multivariate Halley method for solving nonlinear systems of equations
[AD-A127782] N83-32472
DIFFERENTIAL INTERFEROMETRY
Density measurements of a free jet by a laser differential interferometer N83-32497
DIFFUSERS
Diffusion of hydrogen and deuterium in Zr-Al
[DE83-002214] N83-31829
DIFFUSION
Periodic crystallization of binary melts under diffusion controlled mass transfer N83-31702
Hydrogen and deuterium diffusion in vanadium alloys
[DE83-004964] N83-31845
Comparison of lateral and vertical diffusion in several valleys
[DE83-003570] N83-32198
Cloud physics studies in SCPP (Sierra Cooperative Pilot Project) during 1977-82 and in Utah/1978
[PB83-161307] N83-32248

A PACER: A Monte Carlo time-dependent spectrum program for generating few-group diffusion-theory cross sections
[DE83-003779] N83-32351
Computer-simulation studies of grain boundary systems and molecular solids
[AD-A127545] N83-32382
Malliavin's calculus and stochastic integral representations of functionals of diffusion processes
[AD-A127726] N83-32427
An analysis of a finite element method for convection-diffusion problems. Part 2: A posteriori error estimates and adaptivity
[AD-A128261] N83-32439
An analysis of a finite element method for convection-diffusion problems. Part 1: Quasi-optimality
[AD-A128260] N83-32440
Eulerian-Lagrangian relationships in Monte Carlo simulations of turbulent diffusion
[DE83-003490] N83-32453
Theoretical studies of point defects and diffusion in Nb3Sn
[DE83-005146] N83-32630

DIFFUSION COEFFICIENT
Measurement of the critical Marangoni number in a floating zone under reduced gravity N83-31671
Measurements of diffusion coefficient of copper in liquid lead in microgravity by the grain boundary grooving technique N83-31684
Simple theory for maximum H inventory and release: A new transport parameter
[DE82-014076] N83-32641

DIFFUSION FLAMES
Investigation of axisymmetric buoyant turbulent diffusion flames: Turbulence properties and concentrations of major species
[PB83-175612] N83-31915

DIGITAL COMPUTERS
Calculation of turbulent convective heat exchange in a cylindrical channel with a sudden expansion: Communication 2
[BLL-M-34991-(5828.4)] N83-31995
Frequency response of finite-aperature sample-and-hold systems
[DE83-002279] N83-32348

DIGITAL SIMULATION
Development of the MICROSAS longitudinal flight control system for the augmentor wing aircraft
[AD-A128331] N83-31608
Electromagnetic scattering
[AD-A127899] N83-31932
Elements of simulation error analysis
[AD-A128497] N83-32450
Simple model order reduction by truncation with performance verification by fast digital simulation
[RR-217] N83-32460

DIGITAL SYSTEMS
Development of the MICROSAS longitudinal flight control system for the augmentor wing aircraft
[AD-A128331] N83-31608
A lateral-directional controller for high-angle-of-attack flight
[AD-A128579] N83-31609
Modem signature analysis
[AD-A127993] N83-31939
Digital communications in spatially distributed interference channels
[AD-A127741] N83-31943
Operating instructions manual for Microprocessor Airborne Data Acquisition and Replay (MADAR) module
[AD-A128558] N83-32031

DIGITAL TECHNIQUES
Basic utility graphics software for the Hewlett-Packard 9845B desktop computer
[PB83-175760] N83-32394

DIGITAL TO ANALOG CONVERTERS
Universal microcomputer interface for data acquisition
[AD-A127875] N83-32346

DIISOCYANATES
Polymer intermediates from limonene
[BMFT-FB-T-83-053] N83-31882

DIMENSIONLESS NUMBERS
Almost cylindrical isorotating liquid bridges for small bond numbers N83-31676

DIMERS
Simultaneous determination of molar absorption coefficients and equilibrium constants for monomer-dimer equilibria
[AD-A128599] N83-31871
Third-harmonic generation for photoionization studies
[DE83-001960] N83-32544

DIODES
IBEX foilles diode experiments
[DE83-009185] N83-31976

DIPOLE ANTENNAS
Measured characteristics of multi-gap loop and asymptotic conical dipole electromagnetic field sensors
[AD-A127817] N83-31974

DIRECTIONAL SOLIDIFICATION (CRYSTALS)
Particle transport induced by directional solidification --- STS 7 N83-31642
Ostwald ripening and solidification behavior of near monotectic ZN-PB alloys N83-31646
Investigation of convective flows in model systems of directional solidification configurations N83-31682
The effect of the natural convection on the solidification of metallic alloys N83-31687
Solidification front dynamics in model systems N83-31689
Directional crystallization of Pb Te under microgravity conditions N83-31703

DISCRIMINATORS
A simple multifunction discriminator for multichannel triggers
[DE83-004193] N83-31981

DISPERSING
The behavior of a metallic dispersion under microgravity conditions N83-31647

DISPERSION
Wind effects on longitudinal dispersion in open-channel flows
[PB83-179697] N83-32251

DISPLAY DEVICES
Synchronized voltage contrast display analysis system
[NASA-CASE-NPO-14567-1] N83-31919
The CRT display evaluation: The multidimensional rating of CRT-generated displays
[DE83-003699] N83-31979

DISSOCIATION
Hydrogen and oxygen from water. Part 6: Quenching the effluent from a solar furnace
[AD-A127457] N83-32182
Inclusion of discrete-to-continuum coupling in multiphoton excitation and dissociation calculations
[NASA-CR-172836] N83-32529
Coulomb dissociation in relativistic heavy-ion reactions
[DE83-005004] N83-32557

DISTANCE
Coherent laser radar remote sensing
[AD-A127717] N83-32053

DISTILLATION
Extractive distillation of nitric acid using the two-pot concept
[DE83-004176] N83-31777
Absorption of ethanol and water vapor by Silicalite, a hydrophobic molecular sieve
[DE83-004981] N83-31788

DISTORTION
Cold weather goggles. Part 5: Acceptable limits of optical distortion
[AD-A127657] N83-32315

DISTRIBUTED PROCESSING
Distributed multiport memory architecture
[NASA-CASE-NPO-15342-1] N83-32342
System analysis for the Huntsville Operational Support Center distributed computer system
[NASA-CR-170840] N83-32344
The application of distributed system architectures for computer-based instructional systems in the Naval Education and Training Command
[AD-A127694] N83-32347
Distributing a database for parallelism
[AD-A127856] N83-32374
Distribution of functionality and levels of functionality as a solution to the CONOPS problem
[AD-A127651] N83-32379
Network management research
[AD-A127667] N83-32398

DISTRIBUTION (PROPERTY)
Thermionic energy converters
[NASA-CASE-LEW-12443-1] N83-32175

DISTRIBUTION FUNCTIONS
On a problem concerning spacings
[AD-A128509] N83-32449
Characterizations of multivariate classes of life distributions
[AD-A127783] N83-32471
A decomposition of the Beta distribution, related order and asymptotic behavior
[AD-A127815] N83-32474
Exact direct-simulation-scheme for the Boltzmann equation/correlation of molecular velocities subject to renewal processes N83-32492

DIURNAL VARIATIONS
Daily flow statistics of Alaskan streams
[PB83-180133] N83-32166
Global atmospheric waves: Mechanical heating of the lower thermosphere
[AD-A127222] N83-32206

DOCUMENTATION
Computer program abstract as software documentation
[DE83-007570] N83-32391
Implementing the Paperwork Reduction Act: Some progress, but many problems remain
[GAO/GGD-83-35] N83-32656

DOCUMENTS
NASA publications guide
[NASA-SP-7047] N83-32671

DOPED CRYSTALS
Structural reliability of yttria-doped, hot-pressed silicon nitride at elevated temperatures
[AD-A127583] N83-31862
Doping and transport studies in In/sub x/Ga/sub 1-x/As/GaAs strained-layer superlattices
[DE83-003915] N83-32640

DOPPLER RADAR
Analysis of NOAA/Alaskan MST radar data
[AD-A127023] N83-31927
Clutter processing of SEEK IGLOO: A modern long range 3-D radar
[AD-A127520] N83-31937

DOSAGE
A small sample evaluation of a Bayesian design method for quantal response model
[AD-A127942] N83-32464

DOSIMETERS
Response of a multi-element dosimeter to calibrated beta sources with E sub max from 0.23 to 3.5 MeV
[DE83-002013] N83-32532

DRAG REDUCTION
Wall layer structure and drag reduction: Bursting rates
[AD-A128004] N83-32003

DRIFT (INSTRUMENTATION)
Design considerations for a high-spatial-resolution positron camera with dense-drift-space MWPC's
[DE83-003051] N83-32590

DRILLING
The applicability of earth coupled heat pumps and factors affecting their performance
[DE83-004616] N83-32021
Drilling at accesses to Earth's mantle N83-32122

DROPS (LIQUIDS)
On thermally-driven movement of drops in microgravity conditions N83-31645
Combustion experiments under microgravity N83-31665
Studies of experiments on droplet burning at reduced gravity N83-31667

DRYING
Heat-transfer characteristics of dry porous particulate beds with internal heat generation --- for reactor safety considerations N83-32012

DUALITY THEOREM
Duality in the theory of Banach lattices N83-32323

DUCTILITY
Use of analytical electron microscopy and Auger electron spectroscopy for evaluating materials
[DE83-003658] N83-31784
Design of strong, ductile, duplex low alloy steels
[DE83-002606] N83-31834
Heat treating effects on environmental hydrogen embrittlement of nickel
[DE83-004921] N83-31844
The brittle to ductile transition in polycrystalline ice under tension
[AD-A127701] N83-32102
Weld-cracking mechanisms in austenitic stainless steels
[DE83-001157] N83-32111
Simplified analysis of shells with local, impulsive loads
[DE83-003791] N83-32119

DURABILITY
Study of fatigue durability of advanced composite materials under conditions of accelerated loading
[NASA-CR-166405] N83-31732

DUST
Near-surface meteorological conditions associated with active resuspension of dust by wind erosion
[DE83-006272] N83-32247

DYE LASERS
A modification to a flashlamp-pumped dye laser to increase stability of the spatial mode
[AD-A128037] N83-32057
High efficiency picosecond pulse generation in the 675-930 NM region from a dye laser synchronously pumped by an argon-ion laser
[AD-A128033] N83-32058

DYNAMIC CHARACTERISTICS
The Shock and Vibration Digest, volume 15, no. 3
[AD-A126991] N83-32089
Dynamic applications of piezoelectric crystals. Part 1: Fundamentals N83-32091
Software prototyping in the Software Engineering Laboratory N83-32360

Dynamical phenomena in sunspots
[AD-A126931] N83-32698
DYNAMIC CONTROL
System for controlled acoustic rotation of objects
[NASA-CASE-NPO-15522-1] N83-32516
DYNAMIC LOADS
Dynamic fracture behavior of structural materials
[AD-A127902] N83-32101
DYNAMIC PROGRAMMING
Differential games and representation formulas for solutions of Hamilton-Jacobi-Isaacs equations
[AD-A127758] N83-32445
Algorithms and heuristics for variable-yield lot-sizing
[AD-A127559] N83-32478
DYNAMIC RESPONSE
Structural reliability of yttria-doped, hot-pressed silicon nitride at elevated temperatures
[AD-A127583] N83-31862
Computer analysis for dynamic response of beams and plates on elastic foundations
[AD-A127504] N83-32105
An improved strain hardening characterization in the ADINA code using the mechanical sublayer model
[AD-A128287] N83-32108
Tension cutoff and parameter identification for the viscoplastic cap model
[AD-A128304] N83-32217
DYNAMIC STRUCTURAL ANALYSIS
The Shock and Vibration Digest, volume 15, no. 4
[AD-A128158] N83-32082
Structures and Dynamics Division: Research and technology plans for FY 1983 and accomplishments for FY 1982
[NASA-TM-85661] N83-32095

E

E REGION
Aurora-region dynamics determined with the Chatanika radar
[AD-A127042] N83-32208
Rocketborne measurements of optical emissions from the auroral E-layer
[AD-A127517] N83-32213
EAR PROTECTORS
Interior noise and vibration measurements on operational military helicopters and comparisons with various ride quality criteria
[NASA-TM-84664] N83-32518
EARTH (PLANET)
Interplanetary mission designs by multiple Earth-Venus-Jupiter swingbys N83-32489
EARTH ATMOSPHERE
Petrosyants interviewed on results of PIGAP program N83-32124
EARTH CRUST
Synthetic seismogram modeling
[AD-A128305] N83-32218
EARTH RESOURCES
Integrated resource inventory for southcentral Alaska (INTRISCA)
[NASA-CR-166514] N83-32150
EARTH TIDES
On computing instantaneous geocentric tides along satellite tracks, the NSWC STT program
[AD-A128568] N83-32264
EARTHQUAKE RESISTANT STRUCTURES
Earthquake Engineering Research, 1982: Overview and recommendations
[PB83-176024] N83-32228
Earthquake engineering research: 1982
[PB83-176032] N83-32229
EARTHQUAKES
The Shock and Vibration Digest, volume 15, no. 3
[AD-A126991] N83-32089
Interactive graphics package for the MEGATEK 7250 terminal of the seismic analysis station at the Centre for Seismic Studies
[AD-A127866] N83-32210
Seismographic networks: Problems and outlook for the 1980's
[AD-A128032] N83-32215
Evaluation of potential surface faulting and other tetonic deformation
[DE83-900503] N83-32222
Regional tectonics and seismicity of southwestern Iowa
[DE83-900978] N83-32226
Intraplate seismicity and seismic risk in the Atlantic Ocean based on teleseismically observed earthquakes
[IOS-136] N83-32227
Earthquake Engineering Research, 1982: Overview and recommendations
[PB83-176024] N83-32228
Oceanic Pn/Sn phases: A qualitative explanation and reinterpretation of the T-phase
[AD-A128343] N83-32266
ECOLOGY
Natural landmarks survey of the islands of the Pacific
[PB83-182501] N83-32161
ECONOMETRICS
Aggregates, activities and overheads
[AD-A127830] N83-32477
ECONOMIC ANALYSIS
Deriving metrics for relating complexity measures to software maintenance costs
[DE83-000672] N83-32390
Algorithms and heuristics for variable-yield lot-sizing
[AD-A127559] N83-32478
ECONOMIC DEVELOPMENT
Bibliography of appropiate technology information for developing countries: Selected abstracts from the NTIS data file (Fourth Edition)
[PB83-113852] N83-32669
ECONOMIC FACTORS
Customer premises services market demand assessment 1980 - 2000: Volume 2
[NASA-CR-168151] N83-31926
Classical linear-control analysis applied to business-cycle dynamics and stability
[NASA-TM-84366] N83-32676
ECOSYSTEMS
Ecological consequences of a CO2-induced climatic change on forest ecosystems, volume 2, part 13
[DOE/EV-10019/13-VOL-2-PT-13] N83-32188
Research needed to determine the present carbon balance of northern ecosystems and the potential effect of carbon dioxide induced climate change
[DOE/EV-10019/14-VOL-2-PT-14] N83-32189
EDITING ROUTINES (COMPUTERS)
Software error data collection and categorization N83-32364
EDUCATION
Multiprogram Laboratory Panel Energy Research Advisory Board. Volume 2: Support studies
[DE83-002694] N83-32668
EFFERENT NERVOUS SYSTEMS
Evoked potential studies of the effects of impact acceleration on the motor nervous system
[AD-A127562] N83-32278
EFFICIENCY
Flexible manufacturing system handbook. Volume 1: Executive summary
[AD-A127927] N83-31899
Homocores, cores and operational inefficiency in superadditive N-person games
[AD-A127918] N83-32476
EFFLUENTS
Anaerobic treatment of gasified effluents
[DE83-001864] N83-31786
EIGENVALUES
The software scene in the extraction of Eigenvalues from sparse matrices
[AD-A127972] N83-32381
Analysis of the look ahead Lanczos algorithm
[AD-A128020] N83-32436
EIGENVECTORS
Analysis of the look ahead Lanczos algorithm
[AD-A128020] N83-32436
EJECTORS
Aerodynamic ejectors in the UK
[BAE-KRS-N-GEN-243] N83-31594
ELASTIC CYLINDERS
Thermo-elastic-plastic analysis of a thick-walled cylinder with temperature-dependent yield stress
[AD-A127447] N83-32099
Elastic fields under a spherical indenter
[AD-A127732] N83-32103
ELASTIC DEFORMATION
Residual-stress characterization by use of elastic-wave-scattering measurements
[DE83-000647] N83-31985
ELASTIC PLATES
Computer analysis for dynamic response of beams and plates on elastic foundations
[AD-A127504] N83-32105
An improved strain hardening characterization in the ADINA code using the mechanical sublayer model
[AD-A128287] N83-32108
ELASTIC PROPERTIES
Elastic fields under a spherical indenter
[AD-A127732] N83-32103
An analysis of conical indentation of an elastic/perfectly plastic half-space by nonlinear finite element techniques
[AD-A127529] N83-32104
High-temperature elastic-plastic and creep properties for SA533 Grade B Class I and SA508 materials
[DE83-901103] N83-32114
NATO/London Mathematical Society Advanced Study Institute on systems of Nonlinear Partial Differential Equations
[AD-A126996] N83-32406
ELASTIC SCATTERING
Residual-stress characterization by use of elastic-wave-scattering measurements
[DE83-000647] N83-31985
Fast-neutron total and scattering cross sections of niobium
[DE83-002285] N83-32537
Psi prime photoproduction at a mean energy of 150 GeV
[DE83-000686] N83-32549
ELASTIC WAVES
Effects of microstructure on the speed and attenuation of elastic waves
[DE83-000671] N83-32116
ELASTOHYDRODYNAMICS
Evaluation of outer race tilt and lubrication on ball wear and SSME bearing life reductions
[NASA-CR-170836] N83-32069
ELASTOMERS
Synthesis, characterization and polymerization of fluorocarbon ether elastomers
[NASA-CR-166487] N83-31723
Fracture mechanics applied to elastomeric composites
[AD-A127000] N83-31856
Tear strength of elastomers under threshold conditions
[AD-A127006] N83-31857
ELECTRIC ARCS
An effect of turbulent diffusion on the glow discharge-to-arc transition
[AD-A128553] N83-32009
ELECTRIC CHARGE
Measurement of strange quark suppression in hadronic vacuum
[DE83-000918] N83-32548
ELECTRIC CONNECTORS
Fault diagnosis of nonlinear analog circuits, volume 5. HAFDIC: A program for generating a hard fault dictionary
[AD-A127021] N83-31958
Fault diagnosis of nonlinear analog circuits. Volume 3: Fault diagnosis in the tableau context
[AD-A127019] N83-31960
ELECTRIC CURRENT
Ambient and cryogenic temperature testing of a 32-channel CMOS multiplexer
[NASA-TM-84385] N83-31957
DSCS 2 LLTWTA helix current anomaly
[AD-A128008] N83-31972
ELECTRIC FIELDS
Study of the electric field inside microchannel plate multipliers
[DE83-003944] N83-31978
Nonthermal ultrasoft X-ray spectra on ZT-40M
[DE83-007123] N83-32534
ELECTRIC GENERATORS
Generating capacity in US electric utilities: How is it used? How much is needed over the decade
[DE83-900733] N83-31990
ELECTRIC MOTOR VEHICLES
Decision models for conducting an economic analysis of alternative fuels for the ice engine
[AD-A127954] N83-31887
Advanced single permanent magnet axipolar ironless stator ac motor for electric passenger vehicles
[NASA-CR-167974] N83-32667
ELECTRIC MOTORS
Advanced single permanent magnet axipolar ironless stator ac motor for electric passenger vehicles
[NASA-CR-167974] N83-32667
ELECTRIC POTENTIAL
Synchronized voltage contrast display analysis system
[NASA-CASE-NPO-14567-1] N83-31919
IBEX foilles diode experiments
[DE83-009185] N83-31976
Development of a leak location system for use on underground electric power transmission cable
[DE83-900533] N83-31983
Improving divider calibration techniques
[DE83-004061] N83-31988
Electrical-breakdown characteristics and testing of high-voltage XLPE- and EPR-insulated cables
[DE83-000721] N83-31989
Millimeter microwave emission by use of plasma produced electrons orbiting a positively-charged wire
[AD-A127240] N83-32046
ELECTRIC POWER PLANTS
Alternate fuels and energy sources for electric department: City of Tallahassee, Florida
[DE83-001694] N83-31889

ELECTRIC POWER SUPPLIES
Design study for a gound microwave power transmission system for use with a high-altitude powered platform
[NASA-CR-168344] N83-32180
ELECTRIC POWER TRANSMISSION
Development of a leak location system for use on underground electric power transmission cable
[DE83-900533] N83-31983
ELECTRIC RELAYS
Flight termination system equipment. Volume 3: Relays, timers, and switches
[AD-A127479] N83-31708
ELECTRIC SPARKS
Electric spark sensitivity profile of explosible/combustible systems
[PB83-177865] N83-31792
Method and device for detection of a substance --- determining carbon fiber release in fire situations
[NASA-CASE-NPO-14940-1] N83-31954
ELECTRIC WIRE
The effects of corona and angle of arrival on the EMP response of cables lying on the surface of the Earth
[AD-A127060] N83-31928
ELECTRICAL FAULTS
Fault diagnosis of nonlinear analog circuits. Volume 4: An isolation algorithm for the analog fault dictionary
[AD-A127020] N83-31959
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 8: Fault simulation
[AD-A128019] N83-31971
Fault-current limiter using a superconducting coil
[DE83-003557] N83-31986
ELECTRICAL MEASUREMENT
Contact-potential and surface-charge effects in atmospheric-electrical instrumentation
[NASA-CR-172834] N83-32027
Negative phase sequence recorder based on a single chip microcomputer
[PB83-184689] N83-32043
ELECTRICAL RESISTIVITY
Interface character of aluminum-graphite metal matrix composites
[AD-A127590] N83-31736
Study of the anomalous behavior of the electrical resistivity in alloys near the PrNi5.0 composition
[DE83-004787] N83-31847
Method and device for detection of a substance --- determining carbon fiber release in fire situations
[NASA-CASE-NPO-14940-1] N83-31954
Study of the electric field inside microchannel plate multipliers
[DE83-003944] N83-31978
Effect of pressure on the resistivity and Hall coefficient of amorphous metallic alloys
[DE83-005399] N83-32631
ELECTRO-OPTICS
Environmental standards for electro-optical systems
[AD-A127776] N83-32588
ELECTROCATALYSTS
Electrocatalysis on ion-implanted electrodes
[DE82-015768] N83-31787
ELECTROCHEMICAL OXIDATION
Hydrogen and sulfur from hydrogen sulfide 2: Ambient temperature electrolysis using oxidation of hydrogen sulfide by air as the prime energy source
[AD-A127488] N83-31749
Shunt current control methods in electrochemical systems applications
[DE83-004015] N83-31769
ELECTROCHEMISTRY
Bis(bipyrazine)ruthenium(II) complexes: Characterization, spectroscopy and electrochemistry
[AD-A127500] N83-31751
Shunt current control methods in electrochemical systems applications
[DE83-004015] N83-31769
Electrochemical mass transfer to parallel plates with and without turbulence promoters: Simulation of plate heat exchanger configurations
[PB83-183145] N83-31794
Electro-chemical synthesis of organo-metallic nickel compounds
[BLL-OA-TRANS-3018-(6196.3)] N83-31797
ELECTRODEPOSITION
Development of molten salt baths for the electrodeposition of gold and gold alloys
[BMFT-FB-T-83-051] N83-31849
ELECTRODES
Polymer films on electrodes. Part 13: Incorporation of catalysts into electronically conductive polymers: Iron phthalocyanine in polypyrrole
[AD-A127700] N83-31863
A method for making an alkaline battery electrode plate
[NASA-TM-77249] N83-31956
Semiconductor electrodes. Part 51: Efficient electroluminescence at ZnS electrode in aqueous electrolytes
[AD-A127454] N83-31966
Thermionic energy converters
[NASA-CASE-LEW-12443-1] N83-32175
ELECTROLUMINESCENCE
Semiconductor electrodes. Part 51: Efficient electroluminescence at ZnS electrode in aqueous electrolytes
[AD-A127454] N83-31966
ELECTROLYSIS
Hydrogen and sulfur from hydrogen sulfide 2: Ambient temperature electrolysis using oxidation of hydrogen sulfide by air as the prime energy source
[AD-A127488] N83-31749
Effectiveness of boriding of steel in molten sodium-boron-silicate baths
[BLL-M-34988-(5828.4)] N83-31803
A method for making an alkaline battery electrode plate
[NASA-TM-77249] N83-31956
ELECTROLYTES
Electrolyte solutions near the critical point of water: A review and proposal for studies under microgravity conditions N83-31698
ELECTROLYTIC CELLS
Semiconductor electrodes. Part 51: Efficient electroluminescence at ZnS electrode in aqueous electrolytes
[AD-A127454] N83-31966
ELECTROMAGNETIC FIELDS
Three-dimensional computer modeling of electromagnetic fields: A global-lookback lattice-truncation scheme
[DE83-006583] N83-31949
ELECTROMAGNETIC INTERACTIONS
Topics in phenomenology of unified gauge theories of weak, electromagnetic, and strong interactions
[DE83-004241] N83-32554
ELECTROMAGNETIC INTERFERENCE
Southwest PAVE PAWS radar system: Environmental assessment
[AD-A128554] N83-31945
Tactical application of an atmospheric mixed-layer model
[AD-A127527] N83-32212
ELECTROMAGNETIC MEASUREMENT
Electromagnetic Stirred Mode Cavities (SMCs) --- metrology
[NPL-DES-75] N83-31955
ELECTROMAGNETIC PULSES
Calculation of the shielding effect of solid shell enclosures
[AWRE-O18/82] N83-31920
The effects of corona and angle of arrival on the EMP response of cables lying on the surface of the Earth
[AD-A127060] N83-31928
ELECTROMAGNETIC RADIATION
Backscattering from anisotropic random media
[AD-A127873] N83-31933
Electromagnetic mirror dynamics
[AD-A127515] N83-31938
ELECTROMAGNETIC SCATTERING
Electromagnetic scattering
[AD-A127899] N83-31932
Backscattering from anisotropic random media
[AD-A127873] N83-31933
ELECTROMAGNETIC SHIELDING
Calculation of the shielding effect of solid shell enclosures
[AWRE-O18/82] N83-31920
ELECTROMAGNETIC WAVE TRANSMISSION
Gyrotron transmitting tube
[NASA-CASE-LEW-13429-1] N83-31952
ELECTROMAGNETISM
Linear magnetic bearing
[NASA-CASE-GSC-12517-1] N83-32067
ELECTROMECHANICAL DEVICES
Nondestructive inspection and measurement
[AD-A127971] N83-32077
ELECTRON ACCELERATORS
IBEX foilles diode experiments
[DE83-009185] N83-31976
Transition radiation: A possible diagnostic tool for relativistic electrons at Sandia
[DE83-006844] N83-32533
Picosecond X-ray generation from picosecond photoelectron pulses
[AD-A128031] N83-32586
ELECTRON BEAMS
Retrograde amnesia, in rats, produced by electron beam exposure
[AD-A126870] N83-32282
Rotational temperature measurements in free jet expansions on N sub 2 using electron beam fluorescence technique N83-32496
Extraction and propagation of an intense rotating electron beam
[AD-A127018] N83-32523
Electron and photon stimulated desorption: Benefits and pitfalls
[AD-A128239] N83-32527
ELECTRON CYCLOTRON HEATING
Proposed 60 GHz transmission line system for Electron Cyclotron Radiation Heating (ECRH) on W 7 Advanced Stellarator (AS)
[IPF-82-17] N83-32612
ELECTRON DIFFRACTION
Picosecond X-ray generation from picosecond photoelectron pulses
[AD-A128031] N83-32586
ELECTRON DISTRIBUTION
The inner edge of the plasma sheet and the diffuse aurora
[NASA-TM-85062] N83-32595
ELECTRON ENERGY
High-resolution electron-energy-loss spectroscopy and photoelectron-diffraction studies of the geometric structure of adsorbates on single-crystal metal surfaces
[DE83-003395] N83-31764
Energy disposal in electronically excited halogens and oxygen
[AD-A127585] N83-32051
ELECTRON MICROSCOPY
Analysis of oxide and oxide/matrix interfaces in silicon nitride
[PB83-178699] N83-31883
Synchronized voltage contrast display analysis system
[NASA-CASE-NPO-14567-1] N83-31919
Cross-sectional transmission electron microscopy of semiconductors
[DE83-003662] N83-32627
ELECTRON MOBILITY
Doping and transport studies in In/sub x/Ga/sub 1-x/As/GaAs strained-layer superlattices
[DE83-003915] N83-32640
ELECTRON PARAMAGNETIC RESONANCE
Magnetic-resonance studies of reactively sputtered amorphous silicon-hydrogen alloys
[DE83-004958] N83-31842
ELECTRON PHOTON CASCADES
Development of data-acquisition-and-analysis systems for in-beam gamma-ray spectroscopy: A study of the nucleus 180W
[DE83-004992] N83-31781
Study of the electric field inside microchannel plate multipliers
[DE83-003944] N83-31978
ELECTRON SPECTROSCOPY
Use of analytical electron microscopy and Auger electron spectroscopy for evaluating materials
[DE83-003658] N83-31784
Photoelectron spectrometer for high-resolution angular resolved studies
[DE83-008687] N83-32033
ELECTRON TRANSFER
Gordon Research Conference in Organometer Chemistry
[AD-A127055] N83-31725
Kinetics and mechanisms of the reactions of aliphatic free radicals with organocobaloximes and fluoropentaamminecobalt (III) ion and of iron (III) with methyrodoxime
[DE83-004856] N83-31779
ELECTRON TRANSITIONS
Inclusion of discrete-to-continuum coupling in multiphoton excitation and dissociation calculations
[NASA-CR-172836] N83-32529
ELECTRON TUBES
Gyrotron transmitting tube
[NASA-CASE-LEW-13429-1] N83-31952
ELECTRON TUNNELING
Classical and semiclassical aspects of chemical dynamics
[DE83-0002024] N83-31766
Fundamental limits on SQUID technology
[DE83-002561] N83-32629
ELECTPONIC CONTROL
Electronic time switch evaluation study
[AD-A127870] N83-31964
ELECTRONIC EQUIPMENT
Study of the causes of unnecessary removals of avionic equipment
[AD-A127546] N83-31570
Relationship between manufacturing yields and field failure rates of electronic equipment
[AD-A128498] N83-32078
Failure detection with uncertain models
[NASA-CR-172835] N83-32417

ELECTRONIC EQUIPMENT TESTS
Synchronized voltage contrast display analysis system
[NASA-CASE-NPO-14567-1] N83-31919
Fault diagnosis of nonlinear analog circuits. Volume 4: An isolation algorithm for the analog fault dictionary
[AD-A127020] N83-31959
ELECTRONS
Electronically induced phase transformations
[AD-A127031] N83-31745
Stopping powers and ranges of electrons and positrons
[PB83-175687] N83-32562
ELECTROPHORESIS
Salyut-7 passes one year in orbit mark N83-31620
ELECTROPLATING
Electroplating of refractory metals and alloys from fluoride melt
[AD-A127116] N83-31819
Development of molten salt baths for the electrodeposition of gold and gold alloys
[BMFT-FB-T-83-051] N83-31849
ELECTROSLAG WELDING
Development of narrow gap welding technology for extremely thick steel
[PB83-178913] N83-31909
ELECTROSTATICS
Millimeter microwave emission by use of plasma produced electrons orbiting a positively-charged wire
[AD-A127240] N83-32046
ELEMENTARY EXCITATIONS
Localization of surface excitations and stimulated desorption
[DE83-002143] N83-32625
ELEMENTARY PARTICLE INTERACTIONS
Topics in phenomenology of unified gauge theories of weak, electromagnetic, and strong interactions
[DE83-004241] N83-32554
ELEMENTARY PARTICLES
Search for new heavy techniparticles
[DE83-003945] N83-32551
Luminosity of continuous beams with crossing angle
[DE83-003279] N83-32593
ELEVATION ANGLE
LANDSAT data preprocessing
[E83-10380] N83-32133
ELLIPSES
Degree of the fibers of an elliptic fibration N83-32339
ELLIPSOIDS
Near field analysis of airborne antenna
[AD-A127246] N83-31931
ELLIPTIC DIFFERENTIAL EQUATIONS
A singular perturbation approach for the analysis of the fundamental semiconductor equation
[AD-A127728] N83-32425
Quasilinear elliptic-parabolic differential equations
[PREPRINT-568] N83-32458
EMBEDDED COMPUTER SYSTEMS
Design Aids for Real-Time Systems (DARTS) N83-32363
EMBRITTLEMENT
Study of intergranular embrittlement in Fe-12Mn alloys
[DE83-002623] N83-31835
Heat treating effects on environmental hydrogen embrittlement of nickel
[DE83-004921] N83-31844
EMISSION
Emission characteristics of a medium-speed diesel using water-emulsified residual fluids
[DE83-001552] N83-32073
EMISSION SPECTRA
Spectrometer sensitivity investigations on the spectrometric oil analysis program
[AD-A127969] N83-31752
Rocketborne measurements of optical emissions from the auroral E-layer
[AD-A127517] N83-32213
Research studies on radiative collisional processes
[AD-A128533] N83-32509
EMPLOYEE RELATIONS
Management's role for reducing employee stress
[AD-A127126] N83-32659
EMULSIONS
Emission characteristics of a medium-speed diesel using water-emulsified residual fluids
[DE83-001552] N83-32073
ENAMELS
Development of interim performance criteria for restoration coatings for porcelain enamel surfaces
[PB83-185553] N83-31884
ENERGY ABSORPTION
Design and test criteria for increased energy-absorbing seat effectiveness
[AD-A128015] N83-31589
ENERGY BANDS
Electronically induced phase transformations
[AD-A127031] N83-31745
ENERGY CONSERVATION
Fuel conservation evaluation of US Army helicopters. Part 5: AH-1S slight testing
[AD-A128532] N83-31601
Hydrocarbons from plants and trees
[DE83-002228] N83-31727
Electronic time switch evaluation study
[AD-A127870] N83-31964
Energy conservation for housing: A workbook
[PB83-185330] N83-32186
Environmental evaluation of alternatives for long-term management of Defense high-level radioactive wastes at the Idaho Chemical Processing Plant
[DE83-002504] N83-32572
Results of comprehensive programs summarized N83-32650
ENERGY CONSUMPTION
Absorption of ethanol and water vapor by Silicalite, a hydrophobic molecular sieve
[DE83-004981] N83-31788
Electronic time switch evaluation study
[AD-A127870] N83-31964
Generating capacity in US electric utilities: How is it used? How much is needed over the decade
[DE83-900733] N83-31990
Design, construction, testing and evaluation of a residential ice storage air conditioning system
[AD-A128582] N83-32163
Advanced single permanent magnet axipolar ironless stator ac motor for electric passenger vehicles
[NASA-CR-167974] N83-32687
ENERGY CONVERSION
Analysis of gas purification by heatless adsorption
[DE83-003965] N83-31783
Alternate fuels and energy sources for electric department: City of Tallahassee, Florida
[DE83-001694] N83-31889
Solar-simulator-pumped atomic iodine laser kinetics
[NASA-TP-2182] N83-32044
ENERGY CONVERSION EFFICIENCY
Design and development testing of an improved high-efficiency water heater
[DE83-006136] N83-31904
Technology for energy-efficient buildings
[DE83-005927] N83-31905
Thermionic energy converters
[NASA-CASE-LEW-12443-1] N83-32175
ENERGY DISSIPATION
High-resolution electron-energy-loss spectroscopy and photoelectron-diffraction studies of the geometric structure of adsorbates on single-crystal metal surfaces
[DE83-003395] N83-31764
ENERGY LEVELS
Spectroscopic properties of the f-elements in compounds and solutions
[DE83-007963] N83-31759
Determination of the angular and energy dependence of hard constituent scattering from pi-O pair events at the CERN intersecting storage rings
[DE83-002451] N83-32538
ENERGY POLICY
Energy: A continuing bibliography with indexes
[NASA-SP-7043(37)] N83-32178
ENERGY SPECTRA
Microstructural characterization of nuclear-waste ceramics
[DE83-000362] N83-31860
ENERGY STORAGE
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible
[AD-A128534] N83-32062
Department of Energy Civilian Research and Development Authorization Act for fiscal year 1984
[H-REPT-98-81] N83-32683
ENERGY TECHNOLOGY
Buckling of steel-containment shells. Task 1B: Buckling of Washington Public Power Supply Systems' plant no. 2 containment vessel
[DE83-901036] N83-32118
Energy: A continuing bibliography with indexes
[NASA-SP-7043(37)] N83-32178
Multiprogram Laboratory Panel Energy Research Advisory Board. Volume 2: Support studies
[DE83-002694] N83-32668
ENERGY TRANSFER
Energy release and fluid dynamics in multiphase systems
[AD-A128289] N83-32005
Energy disposal in electronically excited halogens and oxygen
[AD-A127585] N83-32051
ENGINE CONTROL
Control means for a gas turbine engine
[NASA-CASE-LEW-14586-1] N83-31603
ENGINE NOISE
Vibration analysis of piston engines with application to noise control N83-32083
ENGINE TESTS
Engine performance comparison associated with carburetor icing during aviation grade fuel and automotive grade fuel operation
[DOT/FAA/CT-82/110] N83-31604
ENGINEERING MANAGEMENT
Earthquake engineering research: 1982
[PB83-176032] N83-32229
ENTIRE FUNCTIONS
The smallest superharmonic majorant and its relation to the existence of entire functions of the exponential type playing the role of multiplier N83-32333
ENTRAINMENT
Liquid transfer and entrainment correlation for droplet-annular flow
[DE83-007703] N83-32019
ENTROPY
Mathematical representation of size and electronic factors
[DE83-004182] N83-32455
ENTROPY (STATISTICS)
The entropic penalty approach to stochastic programming
[AD-A127920] N83-32462
ENVIRONMENT EFFECTS
Jurist comments on legal questions regarding US shuttle N83-31631
Preliminary perspective on pure methanol fuel for transportation
[PB83-180232] N83-31892
Polymer concrete patching manual
[PB83-180265] N83-31912
Southwest PAVE PAWS radar system: Environmental assessment
[AD-A128554] N83-31945
Deforestation: Environmental impact and research needs
[GPO-12-976] N83-32192
Critical considerations in the assessment of health and environmental risks: What we have learned from the nuclear experience
[DE83-005292] N83-32194
Proline metabolism in plants under environmental stresses
[DE83-002735] N83-32284
Thermal impact of waste emplacement and surface cooling associated with geologic disposal of nuclear waste
[DE83-007314] N83-32565
ENVIRONMENT PROTECTION
In-depth survey report of American Airlines plating facility
[PB83-187799] N83-31915
Biological intrusion barriers for large-volume waste-disposal sites
[DE83-002061] N83-32571
Overview assessment of nuclear-waste management
[DE83-004472] N83-32574
ENVIRONMENTAL TESTS
Fixture for environmental exposure of structural materials under compression load
[NASA-CASE-LAR-12602-1] N83-32081
ENZYMES
Proline metabolism in plants under environmental stresses
[DE83-002735] N83-32284
EPOXY COMPOUNDS
Effect of the extent of cure on the modulus, glass transition, water absorption, and density of an amine-cure epoxy
[AD-A127090] N83-31859
EPOXY RESINS
Development of phosphorylated adhesives
[NASA-CR-166507] N83-31724
The CAD/CAM handbook for polymer composite reliability, volume 2
[AD-A127721] N83-31864
EQUATIONS OF MOTION
Design of a multivariable tracker control law for the A-7D Digitac 2 aircraft
[AD-A127440] N83-31607
Perturbation analysis of the limit cycle of the free van der Pol equation
[NASA-CR-172166] N83-32341
Computation of two-dimensional, transonic, chemically reacting nonequilibrium flow in a rocket nozzle N83-32487

EQUATIONS OF STATE
SESAME '83: Report on the Los Alamos equation-of-state library
[DE83-008263] N83-32388
Four pi physics with the plastic ball
[DE83-004190] N83-32556
EQUILIBRIUM
Analysis of gas purification by heatless adsorption
[DE83-003965] N83-31783
Thermo-elastic-plastic analysis of a thick-walled cylinder with temperature-dependent yield stress
[AD-A127447] N83-32099
EQUILIBRIUM EQUATIONS
Almost cylindrical isorotating liquid bridges for small bond numbers N83-31676
Stability of axisymmetric liquid bridges N83-31679
EQUIPMENT
Flexible manufacturing system handbook. Volume 3: Buyer/user's guide
[AD-A127929] N83-31901
Flexible manufacturing system handbook. Volume 4. Appendices
[AD-A127930] N83-31902
EQUIPMENT SPECIFICATIONS
Minizone image furnace — for reduced gravity experiments N83-31658
ERBIUM
Observation of a first-order phase transition in single-crystal ErRh-4B4 at Hc-2
[DE83-008609] N83-32623
EROSION
Use of remote sensing techniques and the universal soil loss equation to determine soil erosion
[PB83-182006] N83-32172
Near-surface meteorological conditions associated with active resuspension of dust by wind erosion
[DE83-006272] N83-32247
ERROR ANALYSIS
Effect of test result uncertainty on the performance of a context-free troubleshooting task
[AD-A128584] N83-31573
Annual data and verification tabulation Atlantic tropical cyclones 1982
[PB83-184077] N83-32255
Software errors and complexity: An empirical investigation N83-32358
Software error data collection and categorization N83-32364
Classifying bugs is a tricky business N83-32365
Error taxonomy: What can be gained? N83-32366
Elements of simulation error analysis
[AD-A128497] N83-32450
ERROR CORRECTING CODES
New syndrome decoding techniques for convolutional codes over GFq
[AD-A127955] N83-32432
ERROR DETECTION CODES
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 7: Built-In Testing (BIT) and Built-In Test Equipment (BITE)
[AD-A128587] N83-31975
Proceedings of the Seventh Annual Software Engineering Workshop
[NASA-TM-85400] N83-32356
ERROR FUNCTIONS
Attitude control experiment of sounding rocket S-520-5 N83-32491
ERRORS
Summary of analysis of sources of forecasting errors in BP 1500 requirements estimating process and description of compensating methodology
[AD-A128548] N83-31574
Satellite transmission of ODAS-451 data during July and August 1982
[PB83-183632] N83-32253
ESCAPE SYSTEMS
Service life evaluation of rigid explosive transfer lines
[NASA-TP-2143] N83-31596
ESTIMATES
Estimation programs for dynamic flight test data analysis
[AD-A128527] N83-31585
Computer program analysis of helicopter weight estimate relationships utilizing parametric equations
[AD-A128590] N83-31600
Ground-water resources of the White River Basin, Hamilton and Tipton Counties, Indiana
[PB83-184309] N83-32169
Use of remote sensing techniques and the universal soil loss equation to determine soil erosion
[PB83-182006] N83-32172
Distribution of tidal bottom stress in a New Hampshire estuary
[PB83-184085] N83-32276
Optimum multisensor, multitarget time delay estimation
[AD-A127639] N83-32423
ESTIMATING
The equivalence of three techniques for estimating ground reflectance from LANDSAT digital count data
[E83-10378] N83-32131
Estimates of software size from state machine designs N83-32368
Multiple state models with covariates: Analysis and Simulation
[AD-A127439] N83-32409
A result on the computational complexity of heuristic estimates for the A algorithm
[AD-A127901] N83-32411
Inference on parameters in a linear model, a review of recent results
[AD-A127486] N83-32429
ESTUARIES
Distribution of tidal bottom stress in a New Hampshire estuary
[PB83-184085] N83-32276
ETHERS
Method for the preparation of polymers
[DE83-004941] N83-31880
ETHYL ALCOHOL
Absorption of ethanol and water vapor by Silicalite, a hydrophobic molecular sieve
[DE83-004981] N83-31788
Small continuous ethanol plant for farm
[DE82-014675] N83-31890
Technical considerations in choosing alcohol fuels for less-developed countries
[DE83-004644] N83-31891
EULER-LAGRANGE EQUATION
Eulerian-Lagrangian relationships in Monte Carlo simulations of turbulent diffusion
[DE83-003490] N83-32453
Use of Eulerian initial conditions in a Lagrangian model of turbulent diffusion
[DE83-003479] N83-32454
EUROPEAN SPACE PROGRAMS
New features of the European microgravity programs N83-31639
EVAPORATION
Internal motion in high vacuum systems
[DE83-001417] N83-31906
EVAPOTRANSPIRATION
Evapotranspiration estimates based on surface temperature and net radiation: Development of remote sensing methods
[PB83-175307] N83-32163
Mechanisms, distribution and frequency of groundwater recharge in upland areas of western North Dakota
[PB83-182121] N83-32168
EXCIMER LASERS
Research studies on radiative collisional processes
[AD-A128533] N83-32509
EXCITATION
Research on a new type of negative hydrogen ion source
[AD-A127947] N83-32525
Localization of surface excitations and stimulated desorption
[DE83-002143] N83-32625
EXERCISE PHYSIOLOGY
Comparison of weight training and calisthentic exercise programs in developing strength and muscular endurance in United States Army recruits
[AD-A128067] N83-32295
EXHAUST EMISSION
Influence of chamber length and equivalence ratio on flame propagation in a constant-volume duct
[DE83-002573] N83-31771
The ABAG biogenic emissions inventory project
[NASA-CR-166498] N83-32151
NO-x emissions from pulverized-coal arch-fired boilers
[DE83-901472] N83-32193
EXHAUST GASES
Ferrite catalyst
[DE83-0006514] N83-31762
Catalyst for exhaust-gas purification
[DE83-005019] N83-31770
Flow of gas-particle mixtures
[AD-A127466] N83-32001
EXOSPHERE
Empirical modeling of the geomagnetic variation in the thermosphere
[AD-A127007] N83-32207
EXPANSION
Translation nonequilibrium in a rapid expansion flow from a high temperature source N83-32498
EXPERIMENT DESIGN
Technical implications of a flight experiment design — for microgravity experiments N83-31657
Studies of experiments on droplet burning at reduced gravity N83-31667
Optical investigation of critical behavior in simple fluids at reduced gravity N83-31696
An artificial intelligence technique to generate self-optimizing experimental designs
[AD-A127764] N83-32402
Two orthogonal (v/2)x2v F-rectangle for all even v
[AD-A127948] N83-32433
A small sample evaluation of a Bayesian design method for quantal response model
[AD-A127942] N83-32464
EXPERIMENTATION
Some experiments in low-temperature thermometry
[DE83-004179] N83-32510
EXPERT SYSTEMS
An expert distributed robotics system with comprehension and learning abilities in the aircraft flight domain
[AD-A127739] N83-32401
EXPLOSIVES
Service life evaluation of rigid explosive transfer lines
[NASA-TP-2143] N83-31596
Potassium 4-hydroxyamino-5,7-dinitro-4,5-dihydrobenzofurazanide 3-oxide, the first in a series of new primary explosives
[AD-A128557] N83-31888
Automated instrumentation system verification
[AD-A127775] N83-32030
EXPONENTIAL FUNCTIONS
The smallest superharmonic majorant and its relation to the existence of entire functions of the exponential type playing the role of multiplier N83-32333
Stationary exponential time series: Further model development and a residual analysis
[AD-A128347] N83-32437
Exponential approximations for two classes of aging distributions
[AD-A127924] N83-32463
EXPOSURE
Fixture for environmental exposure of structural materials under compression load
[NASA-CASE-LAR-12602-1] N83-32081
Temperature cycling in rats exposed repetitively to radiofrequency radiation
[AD-A126895] N83-32281
EXTRACTION
Extractive distillation of nitric acid using the two-pot concept
[DE83-004176] N83-31777
Design and implementation of multi-input adaptive signal extractions
[AD-A127038] N83-31983
Extraction and propagation of an intense rotating electron beam
[AD-A127018] N83-32523
EXTRAVEHICULAR ACTIVITY
Star City astronaut training center N83-31622
EXTREMELY HIGH FREQUENCIES
Proposed 60 GHz transmission line system for Electron Cyclotron Radiation Heating (ECRH) on W 7 Advanced Stellarator (AS)
[IPF-82-17] N83-32612
EXTREMELY LOW FREQUENCIES
ELF PVS field strength measurements, October 1977
[AD-A128196] N83-31930
ELF (Extremely Low Frequency) PVS (Propagation Validation System) field strength measurements, January 1977
[AD-A128265] N83-31942

F

F REGION
Aurora-region dynamics determined with the Chatanika radar
[AD-A127042] N83-32208
Variation of equatorial F-region irregularity parameters as a function of solar activity
[AD-A127895] N83-32209
FABRICATION
Small continuous ethanol plant for farm
[DE82-014675] N83-31890
Recent developments in thick mercuric iodide spectrometers
[DE83-003007] N83-32037
Advanced inorganic separators for alkaline batteries and method of making the same
[NASA-CASE-LEW-13171-2] N83-32176
FACTORIZATION
Symmetrisable operators and minimal factorization N83-32320
FAILURE
An SEM analysis of bearing failure due to electrical arcing
[AD-A127827] N83-32071
Some generalizations of the renewal process
[AD-A127522] N83-32431

FAILURE ANALYSIS
Materials investigation of STS-3 parachute failure
[NASA-TM-82540] N83-31712
Fracture behavior of boron aluminum composites at room and elevated temperatures
[AD-A127492] N83-31737
Design of strong, ductile, duplex low alloy steels
[DE83-002606] N83-31834
Use of acoustic emissions to predict ground stability
[PB83-178764] N83-31911
Multiple state models with covariates: Analysis and Simulation
[AD-A127439] N83-32409
Flight-systems safety program
[DE83-001916] N83-32575
FAILURE MODES
Demonstration Advanced Avionics System (DAAS), phase 1
[NASA-CR-166503] N83-31602
FAN BLADES
Structural element and real blade impact testing, volume 1
[AD-A127744] N83-31606
Structural element testing and real blade impact testing, volume 2
[AD-A127957] N83-31738
FAR INFRARED RADIATION
Final Tactical Decision Aid (FTDA) for infrared (8-12 micrometers) systems, manual version. Appendix B: Insolation and sky radiation tables
[AD-A127853] N83-32699
FARADAY EFFECT
Generation of enhanced-scalelength plasmas and Zeeman study of magnetic fields
[AD-A127951] N83-32596
FARM CROPS
Small continuous ethanol plant for farm
[DE82-014675] N83-31890
FAST NEUTRONS
Fast-neutron total and scattering cross sections of niobium
[DE83-002285] N83-32537
Physical basis for prompt-neutron activation analysis
[DE83-003938] N83-32559
FATIGUE (MATERIALS)
Study of fatigue durability of advanced composite materials under conditions of accelerated loading
[NASA-CR-166405] N83-31732
Design technology of advanced composites
[AD-A127892] N83-31735
On fatigue crack growth in a Ti-4, 5Al-5Mo-1.5Cr alloy with metastable beta-phase
[AD-A128048] N83-31825
An SEM analysis of bearing failure due to electrical arcing
[AD-A127827] N83-32071
FATIGUE LIFE
The F-4C/D life extension program
[AD-A127495] N83-31569
FATIGUE TESTING MACHINES
The F-4C/D life extension program
[AD-A127495] N83-31569
FATIGUE TESTS
Effect of microstructure on fatigue crack growth in duplex ferrite-martensite steels
[DE83-003715] N83-31833
FAULTS
Fault diagnosis of nonlinear analog circuits, volume 5. HAFDIC: A program for generating a hard fault dictionary
[AD-A127021] N83-31958
Fault diagnosis of nonlinear analog circuits. Volume 3: Fault diagnosis in the tableau context
[AD-A127019] N83-31960
FEASIBILITY
Diallyl phthalate prepolymer characterization and testing in fiberglass filled molding compounds
[DE83-009352] N83-31874
FEASIBILITY ANALYSIS
Computer Aided System for Developing Aircrew Training (CASDAT)
[AD-A128530] N83-31615
Potential joint civil and military use of military airfields
[PB83-186734] N83-31616
Optical investigation of critical behavior in simple fluids at reduced gravity N83-31696
POD-HOS (Performances Oriented Design-Higher Order Software) interfaces: An examination of AXES/POD relationships and other issues
[AD-A128301] N83-32384
FEDERAL BUDGETS
Federal agencies could save time and money with better computer software alternatives
[GAO/AFMD-83-29] N83-32350
Problems associated with the implementation of management control systems
[AD-A127254] N83-32658
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984
[S-REPT-98-152] N83-32678
National Aeronautics and Space Administration research and development N83-32679
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-32680
Space flight, control and data communications N83-32681
FEEDBACK CONTROL
The applicability of earth coupled heat pumps and factors affecting their performance
[DE83-004616] N83-32021
Robustness with simultaneous pole and zero movement across the j-omega axis
[OUEL-1465/83] N83-32404
FEMALES
Women at sea: Welcome aboard
[AD-A128602] N83-32646
FERMI SURFACES
Fermi-surface properties of CeSn-3 and related compounds
[DE83-008606] N83-32621
Electronic structure of hcp lutetium
[DE83-004866] N83-32643
FERRIMAGNETIC MATERIALS
Influence of ion radiation on the magnetic properties of ferrimagnetic films
[BMFT-FB-T-83-048] N83-32644
FERRITES
Ferrite catalyst
[DE83-0006514] N83-31762
Effect of microstructure on fatigue crack growth in duplex ferrite-martensite steels
[DE83-003715] N83-31833
FERRITIC STAINLESS STEELS
Suitability of low-carbon, ferritic-martensitic steels for cold heading of fastener components
[BLL-M-34972-(5828.4)] N83-31813
Development of ferritic weldments for grain-refined ferritic steels for 4.2K service
[DE83-009059] N83-32072
FERROMAGNETIC MATERIALS
Ferromagnetic porous plastics
[DE83-008679] N83-31875
FERTILITY
Peculiarities in formation of Arabidopsis Thaliana (L.) Heynh, generative organs under space flight conditions
[NASA-TM-77263] N83-32277
FEVER
Circadian growth hormone and prolactin blood concentration during a self-limited viral infection and artificial hyperthermia in man
[AD-A127501] N83-32289
FIBER OPTICS
Space station needs, attributes and architecture options study technology development working group briefing
[NASA-CR-172949] N83-31716
Electronic technology (selected articles)
[AD-A127809] N83-31970
Optimized couplers between junction lasers and single-mode fibers
[AD-A128040] N83-32056
Computer optical fiber data transmission system
[AD-A127724] N83-32585
FIBER RELEASE
Method and device for detection of a substance --- determining carbon fiber release in fire situations
[NASA-CASE-NPO-14940-1] N83-31954
FIBERS (MATHEMATICS)
Annals of the Fourier Institute, volume 33, number 1
[ISSN-0373-0956] N83-32329
Degree of the fibers of an elliptic fibration N83-32339
Fiber cobordism and approximation of a singular submanifold by C(infinity) N83-32340
FIELD STRENGTH
ELF PVS field strength measurements, October 1977
[AD-A128196] N83-31930
ELF (Extremely Low Frequency) PVS (Propagation Validation System) field strength measurements, January 1977
[AD-A128265] N83-31942
FIGHTER AIRCRAFT
Service life evaluation of rigid explosive transfer lines
[NASA-TP-2143] N83-31596
FILE MAINTENANCE (COMPUTERS)
Computer-aided design and fabrication of molds and computer control of injection molding
[PB83-187955] N83-31914
Maintenance estimation methodology N83-32367
FILM COOLING
Thin films from ammonia-borane
[DE83-003567] N83-32628
FINANCIAL MANAGEMENT
Space station needs, attributes and architectural options study costing working group briefing
[NASA-CR-172950] N83-31717
Classical linear-control analysis applied to business-cycle dynamics and stability
[NASA-TM-84366] N83-32676
FINITE DIFFERENCE THEORY
Numerical solutions of floating-zone thermocapillary flows N83-31675
Three-dimensional computer modeling of electromagnetic fields: A global-lookback lattice-truncation scheme
[DE83-006583] N83-31949
Convective heat transfer in buildings: Recent research results
[DE83-015706] N83-32017
The Shock and Vibration Digest, volume 15, no. 4
[AD-A128158] N83-32082
Finite difference methods in vibration analysis N83-32090
Digital synthesis of response-design spectrum compatible earthquake records for dynamic analyses N83-32092
Thermo-elastic-plastic analysis of a thick-walled cylinder with temperature-dependent yield stress
[AD-A127447] N83-32099
Preliminary evaluation of the ground-water-flow system in the Twin Cities metropolitan area, Minnesota
[PB83-174599] N83-32162
Synthetic seismogram modeling
[AD-A128305] N83-32218
Comparison of baroclinic eddy heat transport parameterizations to a simplified general circulation model
[PB83-187849] N83-32257
An iterative method for solving finite difference approximations to Stokes equations
[AD-A127704] N83-32415
A singular perturbation approach for the analysis of the fundamental semiconductor equation
[AD-A127728] N83-32425
Generation of orthogonal, boby-fitted grids using potential flow solution by the panel method N83-32485
FINITE ELEMENT METHOD
Mixed finite element methods with applications to flow and other problems
[AD-A127751] N83-32008
Adaptive finite element processes in structural mechanics
[AD-A127010] N83-32096
Stress analysis for anisotropic hardening in finite-deformation plasticity
[AD-A127063] N83-32098
An analysis of conical indentation of an elastic/perfectly plastic half-space by nonlinear finite element techniques
[AD-A127529] N83-32104
Force method optimization 2. Volume 1: Theoretical development
[AD-A127073] N83-32408
An analysis of a finite element method for convection-diffusion problems. Part 2: A posteriori error estimates and adaptivity
[AD-A128261] N83-32439
An analysis of a finite element method for convection-diffusion problems. Part 1: Quasi-optimality
[AD-A128260] N83-32440
FISHERIES
Satellite Data Distribution System (SDDS). The development and demonstration of new fisheries support products based on remote ocean sensing from satellites
[E83-10399] N83-32147
FISHES
Revised update and retrieval system for the calcofi oceanographic data file
[PB83-189464] N83-32675
FITTING
Non-linear data fitting for analysis of friction stress and recovery in metal alloys
[NPL-DITC-13/82] N83-32093
FIXED POINT ARITHMETIC
Fast Kalman filtering for ARMA (autoregressive moving average) processes: Fixed point implementation
[AD-A126994] N83-32407
FIXTURES
Fixture for environmental exposure of structural materials under compression load
[NASA-CASE-LAR-12602-1] N83-32081
FLAME PROPAGATION
Influence of chamber length and equivalence ratio on flame propagation in a constant-volume duct
[DE83-002573] N83-31771

Numerical simulation of turbulent flame and pressure development in gas explosions
[PB83-177832] N83-31790
Large-scale experiments on turbulent flame and pressure development
[PB83-177840] N83-31791
Application of the ESCIMO theory to turbulent diffusion flames --- Engulfment, Stretching, Inter-diffusion and Moving Observer (ESCIMO)
[CFD/82/7] N83-32023
Transmission of an explosion through an orifice N83-32024
Oxyhydrogen ignition and flame propagation under cryogenic temperatures N83-32484

FLAME RETARDANTS
Development of phosphorylated adhesives
[NASA-CR-166507] N83-31724
Phosphorus-containing imide resins
[NASA-CASE-ARC-11366-1] N83-31854
Fireproof ceramics and process for their manufacture
[DE83-005021] N83-31881
Equipment qualification research test of electrical cable with factor splices and insulation rework: Test no. 2, report no. 1
[DE83-002165] N83-31980

FLAMES
Singular perturbation approach to flame theory with chain and competing reactions
[DE83-000642] N83-31772
Asymptotic flame theory with complex chemistry
[DE83-002077] N83-31774

FLANGES
Optimum design of stiffened plates using the finite element method
[AD-A128556] N83-32110

FLAT PLATES
Rotational and irrotational freestream disturbances interacting inviscidly with a semi-infinite plate
[AD-A127009] N83-31998
Turbulent boundary layer over a flat plate with strong stepwise heating
[DE83-001554] N83-32018

FLIGHT CONTROL
Design of a multivariable tracker control law for the A-7D Digitac 2 aircraft
[AD-A127440] N83-31607
A lateral-directional controller for high-angle-of-attack flight
[AD-A128579] N83-31609

FLIGHT CREWS
Computer Aided System for Developing Aircrew Training (CASDAT)
[AD-A128530] N83-31615

FLIGHT MECHANICS
Glossary of software engineering laboratory terms
[NASA-TM-85395] N83-32354
Software prototyping in the Software Engineering Laboratory N83-32360
Proceedings of the Symposium on Mechanics for Space Flight
[ISAS-SP-1] N83-32480
Interplanetary mission designs by multiple Earth-Venus-Jupiter swingbys N83-32489
Optimization of low thrust trajectories for collinear Lagrange point mission N83-32490
Calendar of selected aeronautical and space meetings
[AGARD-CAL-83/1] N83-32706

FLIGHT PATHS
Flight directors for STOI aircraft
[NASA-CR-166517] N83-31590

FLIGHT RECORDERS
Operating instructions manual for Microprocessor Airborne Data Acquisition and Replay (MADAR) module
[AD-A128558] N83-32031

FLIGHT SAFETY
Flight-systems safety program
[DE83-001916] N83-32575

FLIGHT SIMULATION
Numerical Aerodynamic Simulation (NAS)
[NASA-TM-84386] N83-32397

FLIGHT TESTS
Estimation programs for dynamic flight test data analysis
[AD-A128527] N83-31585

FLOATING
Numerical solutions of floating-zone thermocapillary flows N83-31675

FLOATING POINT ARITHMETIC
Fast Kalman filtering for ARIMA (autoregressive moving average) processes: Fixed point implementation
[AD-A126994] N83-32407

FLORIDA
Alternate fuels and energy sources for electric department: City of Tallahassee, Florida
[DE83-001694] N83-31889

FLOW DISTRIBUTION
Turbulent combustion rate in a spark ignition engine: Some comparisons between model predictions and experiments
[DE83-003205] N83-31767
Analysis of steady, 2-dimensional chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique. Volume 1: Theoretical development
[AD-A127219] N83-31997
Rotational and irrotational freestream disturbances interacting inviscidly with a semi-infinite plate
[AD-A127009] N83-31998
Tests of subgrid-scale models in strained turbulence. Studies of the structure of homogeneous shear flows: Developing a model of turbulence near a wall from solutions of the Navier-Stokes equation
[AD-A128282] N83-32004
Blast wave decay from an exploding hemispherical gas cloud
[PB83-177857] N83-32025
Daily flow statistics of Alaskan streams
[PB83-180133] N83-32166
Generation of orthogonal, boby-fitted grids using potential flow solution by the panel method N83-32485
Lift generation due to vortex shedding N83-32488
Translation nonequilibrium in a rapid expansion flow from a high temperature source N83-32498
Flow field visualization of vapor condensation in the enclosure N83-32504

FLOW GEOMETRY
Influence of geometry on oscillatory Marangoni flows N83-31672

FLOW MEASUREMENT
Daily flow statistics of Alaskan streams
[PB83-180133] N83-32166
Remote sensing determination of hydrograph recession characteristics
[PB83-186627] N83-32170

FLOW STABILITY
Stability of axisymmetric liquid bridges N83-31679

FLOW VELOCITY
Influence of chamber length and equivalence ratio on flame propagation in a constant-volume duct
[DE83-002573] N83-31771
Low-pressure transfer operations
[DE83-003443] N83-32011
Couette flow in continuum to free molecular regime N83-32493

FLUID AMPLIFIERS
A catalog of fluidic C-format laminates
[AD-A128549] N83-31740

FLUID DYNAMICS
Fluid physics under reduced gravity: An overview --- Spacelab experiments N83-31638
Manufacturing in space: Fluid dynamics numerical analysis
[NASA-CR-172944] N83-31996
Energy release and fluid dynamics in multiphase systems
[AD-A128289] N83-32005
Mixed finite element methods with applications to flow and other problems
[AD-A127751] N83-32008
Numerical Aerodynamic Simulation (NAS)
[NASA-TM-84386] N83-32397
NATO/London Mathematical Society Advanced Study Institute on systems of Nonlinear Partial Differential Equations
[AD-A126996] N83-32406
Calendar of selected aeronautical and space meetings
[AGARD-CAL-83/1] N83-32706

FLUID FILLED SHELLS
Method and apparatus for producing gas-filled hollow spheres --- target pellets for inertial confinement fusion
[NASA-CASE-NPO-14596-3] N83-31896

FLUID FILTERS
Quasilinear elliptic-parabolic differential equations
[PREPRINT-568] N83-32458

FLUID FLOW
A variational approach to surface solitary waves
[AD-A127707] N83-32000

FLUID MECHANICS
Fluid physics under reduced gravity: An overview --- Spacelab experiments N83-31638

FLUIDICS
A catalog of fluidic C-format laminates
[AD-A128549] N83-31740

FLUIDIZED BED PROCESSORS
Advanced pressurized fluidized-bed combustion
[DE83-007641] N83-31760
Coal-gasification research studies
[DE83-006604] N83-31763

FLUORESCENCE
Rotational temperature measurements in free jet expansions on N sub 2 using electron beam fluorescence technique N83-32496
Transverse and quantum effects in superfluorescence: Pump dynamics for three-level superfluorescence; An algorithm for transverse, full transient effects in optical bistability in a Fabry-Perot cavity
[AD-A127502] N83-32584
Plasma-edge studies in ISX-B and EBT-S using surface probes and laser-induced fluorescence
[DE83-821045] N83-32601

FLUORINE
F-atom depletion in NF3 combustor laser flows
[AD-A127075] N83-32047

FLUOROAMINES
F-atom depletion in NF3 combustor laser flows
[AD-A127075] N83-32047

FLUOROCARBONS
Synthesis, characterization and polymerization of fluorocarbon ether elastomers
[NASA-CR-166487] N83-31723

FOAMS
Hydrogen combustion in aqueous foams
[DE83-002534] N83-31775

FOCUSING
Gyrotron transmitting tube
[NASA-CASE-LEW-13429-1] N83-31952

FOG
X-ray measurements of water-fog density
[DE83-005139] N83-32243
Cloud water: An important vector of atmospheric deposition
[DE83-004646] N83-32244

FOILS (MATERIALS)
Rapid solidification studies of Ni3Al alloys
[DE83-004648] N83-31838

FOOTPRINTS
Multibeam single frequency synthetic aperture radar processor for imaging separate range swaths
[NASA-CASE-NPO-14525-2] N83-31918

FORECASTING
Summary of analysis of sources of forecasting errors in BP 1500 requirements estimating process and description of compensating methodology
[AD-A128548] N83-31574
Report on solar-neutrino experiments
[DE83-001306] N83-32543
POM (Program Objective Memorandum) FY-85 BP 1500 cost growth and leadtime adjustments: Research results
[AD-A128522] N83-32667

FORESTS
Ecological consequences of a CO2-induced climatic change on forest ecosystems, volume 2, part 13
[DOE/EV-10019/13-VOL-2-PT-13] N83-32188

FORGING
Roll-bonded 300M/1010 steel metal-metal laminates: Forgeability, toughness, fatigue, and stress corrosion
[AD-A127541] N83-31826

FORMALDEHYDE
Urea-formaldehyde foam insulation
[GPO-12-485] N83-32191

FORMAT
The CRT display evaluation: The multidimensional rating of CRT-generated displays
[DE83-003699] N83-31979

FORMIC ACID
Electrocatalysis on ion-implanted electrodes
[DE82-015768] N83-31787

FORMULATIONS
Adaptation of computer program for Pourbaix diagrams to personal computers
[AD-A128259] N83-32385

FORSTERITE
Shock compression of single-crystal forsterite N83-32614

FORTRAN
Interactive graphics package to facilitate a comparison of data with statistical distributions
[AD-A127147] N83-32372

FOSSIL FUELS
Hydrogen and sulfur from hydrogen sulfide 2: Ambient temperature electrolysis using oxidation of hydrogen sulfide by air as the prime energy source
[AD-A127488] N83-31749
Fossil fuel gasification technical evaluation services
[PB83-195107] N83-31894
Indirect solar wind geothermal: Alternative energy sources 4, volume 4
[LC-82-71533] N83-32179

FRACTIONATION
Chemical fractionation of brine in the McMurdo Ice Shelf, Antarctica
[AD-A127821] N83-32262

FRACTURE MECHANICS
Design technology of advanced composites
[AD-A127892] N83-31735
Fracture behavior of boron aluminum composites at room and elevated temperatures
[AD-A127492] N83-31737
Study of intergranular embrittlement in Fe-12Mn alloys
[DE83-002623] N83-31835
Fracture mechanics applied to elastomeric composites
[AD-A127000] N83-31856
Experimental observations of shear patterns in direct shear tests
[PB83-187351] N83-31917
Determination of stress-concentration factor by the caustic curves method
[BLL-M-34987-(5828.4)] N83-32086
Dynamic fracture behavior of structural materials
[AD-A127902] N83-32101
Weld-cracking mechanisms in austenitic stainless steels
[DE83-001157] N83-32111
Applications of energy-release-rate techniques to part-through cracks in experimental pressure vessels
[DE83-003486] N83-32112
Fracture of hot-pressed silicon nitride at elevated temperatures
[DE83-005236] N83-32117
K-band radiometric mapping of sea ice
[AD-A128205] N83-32268
Flight-systems safety program
[DE83-001916] N83-32575
FRACTURE STRENGTH
Tear strength of elastomers under threshold conditions
[AD-A127006] N83-31857
Fracture toughness of polybutadiene at cryogenic temperatures
[AD-A126999] N83-31858
Dynamic fracture behavior of structural materials
[AD-A127902] N83-32101
X-ray topographic fractography of single crystals of molybdenum and niobium
[DE83-005066] N83-32642
FRAGMENTATION
Expansion of the scan endgame program for aircraft survivability studies and development of a supporting user's guide
[AD-A127557] N83-31598
FREE CONVECTION
Free-surface vibration of a floating zone induced by surface tension driven oscillating flow N83-31670
Influence of geometry on oscillatory Marangoni flows N83-31672
Influence of surface tension minimum on surface and buoyancy driven flows in Stokes regime N83-31673
Buoyancy-thermocapillary convection: The role of interfacial deformation N83-31674
Convection-Marangoni effects in solidification-microgravity N83-31681
Convection effects at solid-liquid interfaces: Influence of gravity N83-31686
The effect of the natural convection on the solidification of metallic alloys N83-31687
Oscillatory convection in a spherical cavity due to g-jitter N83-31694
FREE ELECTRON LASERS
Research progress and forecast report for MSNW FEL oscillator program
[AD-A127786] N83-32061
The Brookhaven free-electron laser experiment
[DE83-002840] N83-32064
FREE FLOW
Rotational and irrotational freestream disturbances interacting inviscidly with a semi-infinite plate
[AD-A127009] N83-31998
FREE JETS
Density measurements of a free jet by a laser differential interferometer N83-32497
FREE MOLECULAR FLOW
On the interpolation formula based upon the asymptotic solution to the kinetic model equation N83-32495
FREE VIBRATION
Free-surface vibration of a floating zone induced by surface tension driven oscillating flow N83-31670
FREQUENCY ANALYZERS
Low cost harmonic analyser for the distribution network
[PB83-184697] N83-31992
FREQUENCY DISTRIBUTION
Mesoscale climatology of cloud cover over Korea and Germany
[AD-A127521] N83-32237
FREQUENCY MULTIPLIERS
Semiautomatic AC/DC thermal voltage converter calibration system
[PB83-180224] N83-32042
FREQUENCY RANGES
Coherence studies of geomagnetic fluctuations in the frequency range .05 to 10 Hz
[AD-A127708] N83-31936
The NMR (Nuclear Magnetic Resonance) sensor for calibrating the field of a superconducting solenoid
[AD-A127997] N83-31973
Semiautomatic AC/DC thermal voltage converter calibration system
[PB83-180224] N83-32042
FREQUENCY RESPONSE
Frequency response of finite-aperature sample-and-hold systems
[DE83-002279] N83-32348
FREQUENCY STABILITY
Influence of centering forces on IFR hose instability
[DE83-006719] N83-32536
FRICTION
Non-linear data fitting for analysis of friction stress and recovery in metal alloys
[NPL-DITC-13/82] N83-32093
FUEL COMBUSTION
A study of factors affecting soot formation in a swirl-stabilized combustor
[AD-A128255] N83-31754
FUEL CONSUMPTION
Preliminary perspective on pure methanol fuel for transportation
[PB83-180232] N83-31892
Indirect solar wind geothermal: Alternative energy sources 4, volume 4
[LC-82-71533] N83-32179
FUEL SYSTEMS
LOX/hydrocarbon fuel carbon formation and mixing data analysis
[NASA-CR-168066] N83-31886
FUELS
Alternate fuels and energy sources for electric department: City of Tallahassee, Florida
[DE83-001694] N83-31889
FUNCTION SPACE
From A to Z: Proceedings of a Symposium in Honour of A. C. Zaanen
[MATH-CENTRE-TRACTS-149] N83-32316
Orlicz spaces: A survey of certain aspects N83-32317
Orthomorphisms N83-32318
Embeddings of Riesz subspaces with an application to mathematical statistics N83-32319
Orthomorphisms and the Radon-Nikodym Theorem revisited N83-32321
Compact operators N83-32328
Annals of the Fourier Institute, volume 33, number 1
[ISSN-0373-0956] N83-32329
Etale covering of a Mumford curve N83-32331
The theorem of semi-proper complexification N83-32332
FUNCTIONAL ANALYSIS
From A to Z: Proceedings of a Symposium in Honour of A. C. Zaanen
[MATH-CENTRE-TRACTS-149] N83-32316
Orlicz spaces: A survey of certain aspects N83-32317
Embeddings of Riesz subspaces with an application to mathematical statistics N83-32319
Orthomorphisms and the Radon-Nikodym Theorem revisited N83-32321
Compact operators N83-32328
FUNCTIONALS
Orthomorphisms N83-32318
Malliavin's calculus and stochastic integral representations of functionals of diffusion processes
[AD-A127726] N83-32427
FUNCTIONS (MATHEMATICS)
Explicit smooth velocity kernels for vortex methods
[AD-A127781] N83-32007
FURANS
Potassium 4-hydroxyamino-5,7-dinitro-4,5-dihydrobenzofurazanide 3-oxide, the first in a series of new primary explosives
[AD-A128557] N83-31888
FURNACES
Development of advanced heating facility concepts for microgravity application N83-31653
Heat transfer induced performance characteristics of gradient type furnaces --- spaceborne experiment N83-31654
FUSELAGES
Pressure distributions obtained on a 0.04-scale and 0.02-scale model of the Space Shuttle Orbiter's forward fuselage in the Langley 20-inch Mach 6 air tunnel
[NASA-TM-84629] N83-31636
FUSES (ORDNANCE)
Flight termination system equipment. Volume 4: Safing and arming devices, initiators, and shaped charges
[AD-A127480] N83-31707
FUSION REACTORS
Ion-bombardment effects on the fatigue life of stainless steel under simulated fusion first-wall conditions
[DE83-007145] N83-31827
Oak Ridge beam-analysis system
[DE83002587] N83-32035
Conceptual design report for a fusion engineering device
[DE83-002288] N83-32602

G

GALLIUM ALLOYS
Ga(As,P) strained-layer super-lattices: A ternary semiconductor with independently adjustable band gap and lattice constant
[DE83-003917] N83-32634
GALLIUM ARSENIDES
Ga(As,P) strained-layer super-lattices: A ternary semiconductor with independently adjustable band gap and lattice constant
[DE83-003917] N83-32634
GALLIUM COMPOUNDS
The behavior of a metallic dispersion under microgravity conditions N83-31647
GAME THEORY
An artificial intelligence technique to generate self-optimizing experimental designs
[AD-A127764] N83-32402
Homocores, cores and operational inefficiency in superadditive N-person games
[AD-A127918] N83-32476
GAMMA RAY ABSORPTION
Coulomb dissociation in relativistic heavy-ion reactions
[DE83-005004] N83-32557
GAMMA RAY BURSTS
Thermonuclear model for high energy transients --- X-ray and gamma ray bursts
[DE83-002814] N83-32566
Gamma bursts
[DE83-004810] N83-32704
GAMMA RAY SPECTROMETERS
Recent developments in thick mercuric iodide spectrometers
[DE83-003007] N83-32037
GAMMA RAYS
Physical basis for prompt-neutron activation analysis
[DE83-003938] N83-32559
GAPS
Analysis of gap heating due to stepped tiles in the shuttle thermal protection system
[NASA-TP-2209] N83-31713
Development of narrow gap welding technology for extremely thick steel
[PB83-178913] N83-31909
GARNETS
Influence of ion radiation on the magnetic properties of ferrimagnetic films
[BMFT-FB-T-83-048] N83-32544
GAS COMPOSITION
Influence of composition and substrate bias on structure and inert-gas content of sputter-deposited Ni-La alloys
[DE83-002716] N83-31830
GAS DETECTORS
Detecting monomethylhydrazine rocket fuel vapors with the MDA model 3060 autospot automatic toxic gas detector
[AD-A127512] N83-31722
GAS DYNAMICS
Blast wave decay from an exploding hemispherical gas cloud
[PB83-177857] N83-32025
Proceedings of the Symposium on Mechanics for Space Flight
[ISAS-SP-1] N83-32480
Recent developments in the investigations on the gas-surface interactions N83-32499
Monte Carlo simulation in molecular gas dynamics N83-32500
Rarefaction phenomena in gas ans isotope separation N83-32501
Third-harmonic generation for photoionization studies
[DE83-001960] N83-32544
GAS EXPLOSIONS
Numerical simulation of turbulent flame and pressure development in gas explosions
[PB83-177832] N83-31790
Electric spark sensitivity profile of explosible/combustible systems
[PB83-177865] N83-31792
Transmission of an explosion through an orifice N83-32024
Blast wave decay from an exploding hemispherical gas cloud
[PB83-177857] N83-32025

GAS FLOW
Calculation of turbulent convective heat exchange in a cylindrical channel with a sudden expansion: Communication 2
[BLL-M-34991-(5828.4)] N83-31995
GAS IONIZATION
An effect of turbulent diffusion on the glow discharge-to-arc transition
[AD-A128553] N83-32009
GAS JETS
Containerless high temperature property measurements by atomic fluorescence
[NASA-CR-170835] N83-32522
GAS PRESSURE
Method and apparatus for producing gas-filled hollow spheres --- target pellets for inertial confinement fusion
[NASA-CASE-NPO-14596-3] N83-31896
GAS TUNGSTEN ARC WELDING
Development of ferritic weldments for grain-refined ferritic steels for 4.2K service
[DE83-009059] N83-32072
GAS TURBINE ENGINES
Control means for a gas turbine engine
[NASA-CASE-LEW-14586-1] N83-31603
Silicon-slurry/aluminide coating --- protecting gas turbine engine vanes and blades
[NASA-CASE-13343-2] N83-31795
GAS TURBINES
European Scientific Notes, volume 37, number 1
[AD-A126961] N83-32672
GAS-LIQUID INTERACTIONS
Study of the surface tension minimum of aqueous alcohol solutions and movements at the air-solution interface N83-31668
Almost cylindrical isorotating liquid bridges for small oond numbers N83-31676
Conservation laws for liquid bridges N83-31677
The breaking of axisymmetric noncylindrical liquid oridges N83-31678
Stability of axisymmetric liquid bridges N83-31679
Optical investigation of critical behavior in simple fluids at reduced gravity N83-31696
Adsorption behavior of pure fluids near the gas-liquid critical point N83-31697
High efficiency ozone absorption in organically polluted water (downflow column)
[BMFT-FB-T-83-056] N83-32199
GAS-METAL INTERACTIONS
Precipitation of gas pores in metallic metals during cooling under microgravity N83-31648
The behaviour of welded high strength grain-refined steels under cathodic stress corrosion cracking conditions
[BLL-RISLEY-TR-4741-(9091.9F)] N83-31802
Activity of hydrogen in metal-hydrogen systems: Strontium, thorium-nitrogen and vandaium alloys
[DE83-004976] N83-31843
GASIFICATION
Anaerobic treatment of gasified effluents
[DE83-001864] N83-31786
Pacific Northwest Regional Biomass Program
[PB83-188623] N83-31893
GATES (CIRCUITS)
Fabricate indium-antimonide two-dimensional charge injection device array
[AD-A127638] N83-32618
GAUGE THEORY
Topics in phenomenology of unified gauge theories of weak, electromagnetic, and strong interactions
[DE83-004241] N83-32554
Lattice guage theories
[DE83-002827] N83-32639
GENETICS
Health effects of combustion-generated soot and polycyclic aromatic hydrocarbons: Human cell studies
[DE83-004578] N83-32196
GEOCHEMISTRY
WATEQ3 geochemical model: Thermodynamic data for several additional solids
[DE83-000896] N83-32155
Orientation study of northern Arkansas. National uranium resource evaluation program. Hydrogeochemical and steam-sediment reconnaissance
[DE83-001214] N83-32156
Hydrogeochemical and stream sediment reconnaissance, orientation study of central Louisiana: National uranium resource evaluation program
[DE83-001217] N83-32157
Preliminary evaluation of the ground-water-flow system in the Twin Cities metropolitan area, Minnesota
[PB83-174599] N83-32162
GEODETIC SURVEYS
Intertial survey application to civil works
[AD-A127508] N83-32153
GEOLOGICAL FAULTS
Evaluation of potential surface faulting and other tetonic deformation
[DE83-900503] N83-32222
Paleozoic geology of the New Madrid area
[DE83-900300] N83-32223
Regional tectonics and seismicity of southwestern Iowa
[DE83-900978] N83-32226
GEOLOGICAL SURVEYS
Space survey techniques benefit geology N83-31630
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration
[E83-10389] N83-32142
Paleozoic geology of the New Madrid area
[DE83-900300] N83-32223
GEOLOGY
Geotechnical instrumentation requirements for at-depth testing and repository monitoring in tuff
[DE83-002188] N83-32034
Natural landmarks survey of the islands of the Pacific
[PB83-182501] N83-32161
Geology and engineering characteristics of selected low-permeability gas sands: A survey
[PB83-195099] N83-32230
Systems overview of the subseabed disposal program
[DE83-000091] N83-32569
GEOMAGNETISM
Coherence studies of geomagnetic fluctuations in the frequency range .05 to 10 Hz
[AD-A127708] N83-31936
Empirical modeling of the geomagnetic variation in the thermosphere
[AD-A127007] N83-32207
Regional tectonics and seismicity of southwestern Iowa
[DE83-900978] N83-32226
Ocean floor geomagnetic data collection system
[AD-A127618] N83-32260
Cosmic ray effects on microelectronics. Part 2: The geomagnetic cutoff effects
[AD-A128601] N83-32703
GEOMETRIC ACCURACY
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E83-10373] N83-32128
A preliminary evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies
[E83-10383] N83-32136
GEOMETRICAL OPTICS
A study of computer-aided geometric optical design
[AD-A127438] N83-32345
GEOMETRY
Geology and engineering characteristics of selected low-permeability gas sands: A survey
[PB83-195099] N83-32230
GEOPHYSICS
USSR report: Earth sciences, no. 26
[JPRS-83622] N83-32121
USSR report: Earth sciences, no. 27
[JPRS-83829] N83-32123
Geophysical investigation of eastern Yakima Ridge, south-central Washington
[DE83-002618] N83-32225
GEORGIA
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E83-10373] N83-32128
GEOSYNCHRONOUS ORBITS
Space station needs, attributes and architectural options study review report
[NASA-CR-172947] N83-31714
GEOTHERMAL ENERGY UTILIZATION
Department of Energy Civilian Research and Development Authorization Act for fiscal year 1984
[H-REPT-98-81] N83-32683
GEOTHERMAL RESOURCES
Analysis of geothermal wastes for hazardous components
[PB83-188680] N83-32203
Airborne-temperature-survey maps of heat-flow anomalies for exploration geology
[DE82-019111] N83-32224
GERMANIUM
X-ray diffraction analysis of Nb-3Ge and NbGe alloys
[NASA-CR-170831] N83-31744
High-purity germanium crystal growing
[DE83-004181] N83-32632
GERMANIUM COMPOUNDS
Experiments on crystallization of semiconductors aboard Salyut 6: Soyuz orbital complex N83-31688
GERMINATION
The water factor in harvest-sprouting of hard red spring wheat
[E83-10376] N83-32129
GETTERS
Diffusion of hydrogen and deuterium in Zr-Al
[DE83-002214] N83-31829
GLASS
Reactions in glass melt systems --- in microgravity N83-31663
Chemistry of glass-ceramic/metal bonding for header applications. 1: Effect of treatments on Inconel 718 and Hastelloy C-276 metallic surfaces --- on actuators and initiators
[DE83-003367] N83-32068
Disposal costs for SRP high-level wastes in borosilicate glass and crystalline ceramic waste forms
[DE83-003105] N83-32567
GLASS LASERS
Thermal coupling and damage mechanims of 1.06 micron laser radiation and laser-produced plasma on selected materials
[AD-A127608] N83-32045
GLOBAL POSITIONING SYSTEM
Cost development of the dual-channel GPS (Global Positioning System) navigator for general aviation application
[AD-A127157] N83-31591
GLOW DISCHARGES
Characteristics of thermoluminescence glow curves for materials exhibiting more than one glow peak
[DE83-004602] N83-31778
Austenitic thermochemical treatments in a glow discharge
[PB83-184671] N83-31852
An effect of turbulent diffusion on the glow discharge-to-arc transition
[AD-A128553] N83-32009
GOES SATELLITES
The GOES user's guide N83-31710
GOGGLES
Cold weather goggles. Part 5: Acceptable limits of optical distortion
[AD-A127657] N83-32315
GOLD
Development of molten salt baths for the electrodeposition of gold and gold alloys
[BMFT-FB-T-83-051] N83-31849
GOODNESS OF FIT
Least absolute deviations regression
[DE83-004424] N83-32456
GOVERNMENT PROCUREMENT
Planning and scheduling enhancement in the aquisition process 2tt the Aeronautical Systems Div.
[AD-A128521] N83-32666
GOVERNMENTS
Policy and organization: The next step in the National Space Program
[AD-A127012] N83-31704
GRAIN BOUNDARIES
Measurements of diffusion coefficient of copper in liquid lead in microgravity by the grain boundary grooving technique N83-31684
Motive forces of structural changes in ferrosilicon during heating after slight deformations
[BLL-M-35039-(5828.4)] N83-31799
Development of ferritic weldments for grain-refined ferritic steels for 4.2K service
[DE83-009059] N83-32072
Application of a third-invariant plasticity theory to concrete and soils
[AD-A127079] N83-32097
Computer-simulation studies of grain boundary systems and molecular solids
[AD-A127545] N83-32382
Formation energy of point defects in free surfaces and grain boundaries in MgO
[DE83-008524] N83-32622
GRAPHITE
Interface character of aluminum-graphite metal matrix composites
[AD-A127590] N83-31736
Structure of multi-layer spherical crystals of graphite in cast iron
[BLL-M-35028-(5828.4)] N83-32613
GRAPHITE-EPOXY COMPOSITES
Standard tests for toughened resin composites, revised edition
[NASA-RP-1092-REV] N83-31730
Formulation and characterization of epoxy resin copolymer for graphite composites
[NASA-CR-166501] N83-31731
Fabrication of slender struts for deployable antennas
[NASA-CR-172164] N83-31733
Aeroelastic properties of straight and forward swept graphite/epoxy wings
[AD-A127014] N83-31734
Design technology of advanced composites
[AD-A127892] N83-31735

Improved materials for composite and adhesive joints [AD-A128569] N83-31739
Method and device for detection of a substance --- determining carbon fiber release in fire situations [NASA-CASE-NPO-14940-1] N83-31954

GRAPHS (CHARTS)
Basic utility graphics software for the Hewlett-Packard 9845B desktop computer [PB83-175760] N83-32394

GRASSES
Commentaries on successful plant growing experiments on Salyut-7 N83-31628

GRAVITATIONAL EFFECTS
Scientific goals of the D1-mission --- Spacelab experiment N83-31650
Measurements of diffusion coefficient of copper in liquid lead in microgravity by the grain boundary grooving technique N83-31684
Convection effects at solid-liquid interfaces: Influence of gravity N83-31686
The effect of the natural convection on the solidification of metallic alloys N83-31687
Soldering under microgravity N83-31690
Oscillatory convection in a spherical cavity due to g-jitter N83-31694
Regional tectonics and seismicity of southwestern Iowa [DE83-900978] N83-32226
Interplanetary mission designs by multiple Earth-Venus-Jupiter swingbys N83-32489
The net effect of many gravitational fields on the intensity of celestial light sources [AD-A127514] N83-32694

GRAVITATIONAL FIELDS
Remarks on thermal properties of rotating superfluid helium in a gravitational field N83-32502
Simulation of Brownian motion affected by Gaussian force in gravitational field N83-32503
The net effect of many gravitational fields on the intensity of celestial light sources [AD-A127514] N83-32694

GRAVITATIONAL WAVES
Acoustic and gravity waves in the neutral atmosphere and the ionosphere, generated by severe storms [NASA-CR-170834] N83-32205

GREAT LAKES (NORTH AMERICA)
Great Lakes precipitation by months, 1900-80 [PB83-175737] N83-32250

GREEN FUNCTION
Backscattering from anisotropic random media [AD-A127873] N83-31933

GRIDS
Grid network generation with adaptive boundary points for projectiles at transonic speed [AD-A128041] N83-31584

GROOVING
Measurements of diffusion coefficient of copper in liquid lead in microgravity by the grain boundary grooving technique N83-31684

GROUND BASED CONTROL
Flight control center's history, functions spotlighted N83-31626

GROUND STATIONS
CNPQ/INPE LANDSAT system [E83-10374] N83-32127
Seismographic networks: Problems and outlook for the 1980's [AD-A128032] N83-32215

GROUND TESTS
Composites in ground test services --- aircraft manufacturing [BAE-KGT-N-GEN-00999] N83-31729

GROUND TRUTH
The equivalence of three techniques for estimating ground reflectance from LANDSAT digital count data [E83-10378] N83-32131

GROUND WATER
Geotechnical instrumentation requirements for at-depth testing and repository monitoring in tuff [DE83-002188] N83-32034
Review of ground-water flow and transport models in the unsaturated zone [DE83-004256] N83-32158
Preliminary evaluation of the ground-water-flow system in the Twin Cities metropolitan area, Minnesota [PB83-174599] N83-32162
Bibliography on ground-water recharge in arid and semiarid areas [PB83-182055] N83-32167
Mechanisms, distribution and frequency of groundwater recharge in upland areas of western North Dakota [PB83-182121] N83-32168
Ground-water resources of the White River Basin, Hamilton and Tipton Counties, Indiana [PB83-184309] N83-32169

GROUND WIND
A model for the surface wind field in complex terrain [AD-A127030] N83-32234

GROUP DYNAMICS
Small groups programmed environments: Behavioral and biological interactions [NASA-CR-172853] N83-32306
Methodological contributions of person perception to performance appraisal [AD-A128638] N83-32311

GROUP THEORY
Annals of the Fourier Institute, volume 33, number 1 [ISSN-0373-0956] N83-32329
Degree of the fibers of an elliptic fibration N83-32339

GROWTH
Commentaries on successful plant growing experiments on Salyut-7 N83-31628
Circadian growth hormone and prolactin blood concentration during a self-limited viral infection and artificial hyperthermia in man [AD-A127501] N83-32289

GUST LOADS
Aerodynamics of airfoils subject to three-dimensional periodic gusts [AD-A127043] N83-31581

GYROSCOPIC STABILITY
Ultra-stable laser clock [AD-A127519] N83-32054

H

HADRONS
Measurement of strange quark suppression in hadronic vacuum [DE83-000918] N83-32548

HALL EFFECT
Effect of pressure on the resistivity and Hall coefficient of amorphous metallic alloys [DE83-005399] N83-32631
Doping and transport studies in In/sub x/Ga/sub 1-x/As/GaAs strained-layer superlattices [DE83-003915] N83-32640

HALLEY'S COMET
Discussion of Halley's comet projects N83-31625

HALOGEN COMPOUNDS
IR and visible wavelength obscuration by pyrotechnically generated alkali-halide smokes [AD-A127616] N83-32581

HALOGEN OCCULTATION EXPERIMENT
Halogen Occultation Experiment (HALOE) gas cell life test program [NASA-TM-84640] N83-32028

HAMILTON-JACOBI EQUATION
Existence of viscosity solutions of Hamilton-Jacobi equations [AD-A127691] N83-32421

HAMILTONIAN FUNCTIONS
Differential games and representation formulas for solutions of Hamilton-Jacobi-Isaacs equations [AD-A127758] N83-32445
Noncanonical Hamiltonian formulation of ideal magnetohydrodynamics [DE83-000649] N83-32603

HANDBOOKS
Flexible manufacturing system handbook. Volume 1: Executive summary [AD-A127927] N83-31899
Flexible manufacturing system handbook. Volume 3: Buyer/user's guide [AD-A127929] N83-31901
Terminal forecast reference notebook for Ramstein AB, Germany [AD-A128319] N83-32240

HANDICAPS
Technology and handicapped people [GPO-12-921] N83-32686

HARDENING
Stress analysis for anisotropic hardening in finite-deformation plasticity [AD-A127063] N83-32098

HARDENING (MATERIALS)
Effectiveness of boriding of steel in molten sodium-boron-silicate baths [BLL-M-34988-(5828.4)] N83-31803
Strain hardening of heavily cold-worked metals [DE83-003544] N83-31840
Development of a plasma carburizing process [PB83-186692] N83-31913

HARDNESS
Fireproof ceramics and process for their manufacture [DE83-005021] N83-31881

HARDNESS TESTS
Recommended procedure for micro-indentation Vickers hardness test [NPL-MOM-62] N83-32094

HARDWARE
Demonstration Advanced Avionics System (DAAS), phase 1 [NASA-CR-166503] N83-31602

HARMONIC ANALYSIS
Low cost harmonic analyser for the distribution network [PB83-184697] N83-31992
Distribution of tidal bottom stress in a New Hampshire estuary [PB83-184085] N83-32276

HARMONIC FUNCTIONS
The smallest superharmonic majorant and its relation to the existence of entire functions of the exponential type playing the role of multiplier N83-32333

HARMONIC GENERATIONS
Third-harmonic generation for photoionization studies [DE83-001960] N83-32544

HEALTH
Management's role for reducing employee stress [AD-A127126] N83-32659

HEARING
Preliminary evaluation of two dichotic listening tasks as predictors of performance in naval aviation undergraduate pilot training [AD-A127337] N83-32304

HEAT ACCLIMATIZATION
Hypohydration and acclimation: Effects on hormone responses to exercise/heat stress [AD-A127855] N83-32299

HEAT BALANCE
Temperature cycling in rats exposed repetitively to radiofrequency radiation [AD-A126895] N83-32281
A model of heat loss and thermoregulation for immersion in cold water [AD-A127854] N83-32300

HEAT EXCHANGERS
Small continuous ethanol plant for farm [DE82-014675] N83-31890
Cycling Joule Thomson refrigerator [NASA-CASE-NPO-15251-1] N83-31897
Design and development testing of an improved high-efficiency water heater [DE83-006136] N83-31904
Calculation of turbulent convective heat exchange in a cylindrical channel with a sudden expansion: Communication 2 [BLL-M-34991-(5828.4)] N83-31995
Analysis of field-performance data on shell-and-tube heat exchangers in geothermal service [DE83-001564] N83-32014
Study of heat and mass transfer in a vertical-tube evaporative cooler [DE83-003480] N83-32022
Design, construction, testing and evaluation of a residential ice storage air conditioning system [AD-A128582] N83-32183

HEAT FLUX
Experimental and analytical study of natural-convection heat transfer of internally heated liquids [DE83-005384] N83-32013

HEAT OF COMBUSTION
Noise thermometry measurements in combustion processes [AD-A127945] N83-31758

HEAT PUMPS
The applicability of earth coupled heat pumps and factors affecting their performance [DE83-004616] N83-32021

HEAT RADIATORS
Conceptual designs for 100-MW space radiators [DE83-003542] N83-32020

HEAT SOURCES
Experimental and analytical study of natural-convection heat transfer of internally heated liquids [DE83-005384] N83-32013

HEAT TOLERANCE
Effects of high heat input welding of construction steels A36, A514, and A516 [AD-A127083] N83-31820

HEAT TRANSFER
Heat transfer induced performance characteristics of gradient type furnaces --- spaceborne experiment N83-31654
Analysis of gas purification by heatless adsorption [DE83-003965] N83-31783
Heat transfer to water from a vertical tube bundle under natural-circulation conditions [DE83-008459] N83-32010
Low-pressure transfer operations [DE83-003443] N83-32011

Experimental and analytical study of natural-convection heat transfer of internally heated liquids
[DE83-005384] N83-32013
Analysis of field-performance data on shell-and-tube heat exchangers in geothermal service
[DE83-001564] N83-32014
Convection coefficients at building surfaces
[DE83-002572] N83-32015
The applicability of earth coupled heat pumps and factors affecting their performance
[DE83-004616] N83-32021
Study of heat and mass transfer in a vertical-tube evaporative cooler
[DE83-003480] N83-32022
Semiautomatic AC/DC thermal voltage converter calibration system
[PB83-180224] N83-32042
Comparison of baroclinic eddy heat transport parameterizations to a simplified general circulation model
[PB83-187849] N83-32257
Metabolic and vascomotor insulative responses occurring on immersion in cold water
[AD-A128021] N83-32296
Studies on condensation heat transfer in two-phase closed thermosyphons N83-32505
Unstable phenomena in a two-phase closed thermosyphon N83-32506
The cooling unit for the closed box N83-32507
Heat transfer rate of looped type heat pipes using water and Nak as working fluid under liquid phase flow N83-32508
Large scale superfluid practice
[DE83-001563] N83-32513
Systems overview of the subseabed disposal program
[DE83-000091] N83-32569
Therymodynamic properties of strongly nonideal fluid mixtures from an xtended quasi-chemical theory
[DE83-004295] N83-32645

HEAT TRANSMISSION
Laser-plasma interaction experiments and diagnostics at NRL (Naval Research Laboratory)
[AD-A128254] N83-32060
Airborne-temperature-survey maps of heat-flow anomalies for exploration geology
[DE82-019111] N83-32224

HEAT TREATMENT
Characteristics of heat-treatment of Ri6M5 high-speed powdered steel containing titanium carbide
[BLL-M-34959-(5828.4)] N83-31808
Study of the anomalous behavior of the electrical resistivity in alloys near the PrNi5.0 composition
[DE83-004787] N83-31847
Contact noise in superionic ceramics
[AD-A127824] N83-31870
Fireproof ceramics and process for their manufacture
[DE83-005021] N83-31881
Development of a plasma carburizing process
[PB83-186692] N83-31913
Thin films from ammonia-borane
[DE83-003567] N83-32628

HEATING
Turbulent boundary layer over a flat plate with strong stepwise heating
[DE83-001554] N83-32018

HEAVY IONS
Coulomb dissociation in relativistic heavy-ion reactions
[DE83-005004] N83-32557
Influence of ion radiation on the magnetic properties of ferrimagnetic films
[BMFT-FB-T-83-048] N83-32644

HEAVY NUCLEI
Current analysis for rotating and vibrating heavy nuclei
[DE83-000612] N83-32637

HEIGHT
The elevation and duration of wave crests
[AD-A127872] N83-32259
A new method for the analysis of extremes applicable to one year's data --- wave height return values
[IOS-142] N83-32272

HELICOPTERS
Combat maintenance concepts and repair techniques using shape memory alloys for fluid lines, control tubes and drive shafts
[AD-A127826] N83-31572
Computer program analysis of helicopter weight estimate relationships utilizing parametric equations
[AD-A128590] N83-31600
Interior noise and vibration measurements on operational military helicopters and comparisons with various ride quality criteria
[NASA-TM-84664] N83-32518
Historical inflation program. A computer program generating historical inflation indices for Army aircraft, revision
[AD-A127674] N83-32677

HELIOSPHERE
Comparison of heliospheric current sheet structure obtained from potential magnetic field computations and from observed polarization coronal brightness
[NASA-CR-172832] N83-32700

HELIUM-NEON LASERS
Ultra-stable laser clock
[AD-A127519] N83-32054

HERMETIC SEALS
Chemistry of glass-ceramic/metal bonding for header applications. 1: Effect of treatments on Inconel 718 and Hastelloy C-276 metallic surfaces --- on actuators and initiators
[DE83-003367] N83-32068

HETEROJUNCTIONS
GaP/Al-x/Ga-1-x/P heterojunction bipolar junction transistor for high-temperature electronic applications
[DE83-001267] N83-31977

HEURISTIC METHODS
A result on the computational complexity of heuristic estimates for the A algorithm
[AD-A127901] N83-32411
Preliminary investigation of interconnected systems interactions for the safety injection system of Indian Point-3
[DE83-009172] N83-32451
Algorithms and heuristics for variable-yield lot-sizing
[AD-A127559] N83-32478

HF LASERS
F-atom depletion in NF3 combustor laser flows
[AD-A127075] N83-32047

HIGH ENERGY INTERACTIONS
High energy electromagnetic shower position measurement by a fine grained scintillation hodoscope
[DE83-000082] N83-31951
Transition radiation: A possible diagnostic tool for relativistic electrons at Sandia
[DE83-006844] N83-32533
Production of high-transverse-energy events in p-nucleus collisions at 400 GeV/c
[DE83-002099] N83-32547

HIGH ENERGY OXIDIZERS
Polycyclic high energy oxidizers
[AD-A128309] N83-31869

HIGH FREQUENCIES
Wideband HF channel prober: System description
[AD-A127040] N83-31924

HIGH PRESSURE
Coal-gasification research studies
[DE83-006604] N83-31763
Heat treating effects on environmental hydrogen embrittlement of nickel
[DE83-004921] N83-31844

HIGH RESOLUTION
High-resolution electron-energy-loss spectroscopy and photoelectron-diffraction studies of the geometric structure of adsorbates on single-crystal metal surfaces
[DE83-003395] N83-31764
Accurate, practical simulation of satellite infrared radiometer spectral data
[DE83-002506] N83-32221
Design considerations for a high-spatial-resolution positron camera with dense-drift-space MWPC's
[DE83-003051] N83-32590

HIGH SPEED CAMERAS
Monochromatic high-speed photography of solid rocket propellant combustion
[AD-A127874] N83-31747

HIGH STRENGTH STEELS
The behaviour of welded high strength grain-refined steels under cathodic stress corrosion cracking conditions
[BLL-RISLEY-TR-4741-(9091.9F)] N83-31802

HIGH TEMPERATURE
Coal-gasification research studies
[DE83-006604] N83-31763
Catalyst for exhaust-gas purification
[DE83-005019] N83-31770
Research on hot cracking in weld metal by melting-solidification heat cycle simulator
[PB83-178921] N83-32075

HIGH TEMPERATURE GASES
Translation nonequilibrium in a rapid expansion flow from a high temperature source N83-32498

HIGH TEMPERATURE PLASMAS
Design philosophy for high-resolution rate and throughput spectroscopy systems
[DE83-004117] N83-31782

HIGH TEMPERATURE RESEARCH
Fracture of hot-pressed silicon nitride at elevated temperatures
[DE83-005236] N83-32117

HIGH TEMPERATURE TESTS
High-temperature elastic-plastic and creep properties for SA533 Grade B Class I and SA508 materials
[DE83-901103] N83-32114
Containerless high temperature property measurements by atomic fluorescence
[NASA-CR-170835] N83-32522

HIGH VOLTAGES
High voltage v-groove solar cell
[NASA-CASE-LEW-13401-2] N83-32177

HILBERT SPACE
Some lattice properties of the space L2 N83-32327

HISTOGRAMS
A comparison of the MSIS and Jacchia-70 models with measured atmospheric density data in the 120 to 200 km altitude range
[AD-A128005] N83-32216
Interactive graphics package to facilitate a comparison of data with statistical distributions
[AD-A127147] N83-32372

HISTORIES
The aerodynamics range: A national historic mechanical engineering landmark
[AD-A128042] N83-31706
The background to Cauchy's definition of the integral N83-32326
The importance of practice in the development of statistics
[AD-A127705] N83-32470

HODOSCOPES
High energy electromagnetic shower position measurement by a fine grained scintillation hodoscope
[DE83-000082] N83-31951

HOLES (ELECTRON DEFICIENCIES)
Semiconductor electrodes. Part 51: Efficient electroluminescence at ZnS electrode in aqueous electrolytes
[AD-A127454] N83-31966

HOLOGRAPHIC INTERFEROMETRY
Reconstruction by multidirectional holographic interferometry of the concentration field in a supersaturated solution near a growing NaClO3 crystal N83-31660
Thermal conductivity measurement on fluids under microgravity using holographic interferometry N83-31699
Interferometric angle monitor
[NASA-CASE-GSC-12614-1] N83-32577

HOLOGRAPHY
Holographic investigation of solid propellant combustion particulates
[AD-A127841] N83-32029
Holographic methods for the investigation of photophysical properties
[AD-A128510] N83-32032

HOMOMORPHISMS
Orthomorphisms N83-32318
Some recent results on positive groups and semi-groups N83-32324
Etale covering of a Mumford curve N83-32331

HORIZONTAL ORIENTATION
Melt fingers and pool penetration into a miscible substrate --- for application to the design of post-accident core retention systems for nuclear reactors
[DE83-004511] N83-31768
Analysis and calculation of macrosegregation in a casting ingot, exhibit D
[NASA-CR-170846] N83-31818

HORMONES
Hypohydration and acclimation: Effects on hormone responses to exercise/heat stress
[AD-A127855] N83-32299

HOSES
Influence of centering forces on IFR hose instability
[DE83-006719] N83-32536

HOT CORROSION
Weld-cracking mechanisms in austenitic stainless steels
[DE83-001157] N83-32111

HOT PRESSING
Structural reliability of yttria-doped, hot-pressed silicon nitride at elevated temperatures
[AD-A127583] N83-31862
Fracture of hot-pressed silicon nitride at elevated temperatures
[DE83-005236] N83-32117

HOT-WIRE FLOWMETERS
Thermal conductivity measurement on fluids under microgravity using holographic interferometry N83-31699

HOUSINGS
The cooling unit for the closed box N83-32507

HUGONIOT EQUATION OF STATE
Shock compression of single-crystal forsterite N83-32614

HUMAN BEINGS
Health effects of combustion-generated soot and polycyclic aromatic hydrocarbons: Human cell studies
[DE83-004578] N83-32196

Hypohydration and acclimation: Plasma renin activity and aldosterone during heat/exercise stress
[AD-A128154] N83-32294

HUMAN FACTORS ENGINEERING
Computer Aided System for Developing Aircrew Training (CASDAT)
[AD-A128530] N83-31615
Some effects of stress on users of a voice recognition system: A preliminary inquiry
[AD-A128559] N83-31944
A preliminary analysis of human factors affecting the recognition accuracy of a discrete word recognizer for C3 systems
[AD-A128546] N83-31946
Integration analysis: A proposed integration of test and evaluation techniques for early on detection of human factors engineering discrepancies
[AD-A127611] N83-32314

HUMAN PERFORMANCE
Sleep deprivation and performance: The optimum use of limited sleep periods
[AD-A126934] N83-32291
The role of a mental model in learning to operate a device
[AD-A127281] N83-32305
Small groups programmed environments: Behavioral and biological interactions
[NASA-CR-172853] N83-32306
Exceptional memory
[AD-A126977] N83-32307
Option generation techniques for command and control
[AD-A127715] N83-32308
Psychopharmacological techniques for optimizing human performances
[AD-A128529] N83-32309
Effects of standard extremity on mixed standard scale performance ratings
[AD-A128645] N83-32310

HUMAN TOLERANCES
Interior noise and vibration measurements on operational military helicopters and comparisons with various ride quality criteria
[NASA-TM-84664] N83-32518
Relevance of biotic pathways to the long-term regulation of nuclear-waste disposal. Topical Report on reference western arid low-level sites
[DE83-002575] N83-32576

HYDRATION
Hypohydration and acclimation: Plasma renin activity and aldosterone during heat/exercise stress
[AD-A128154] N83-32294
Hypohydration and acclimation: Effects on hormone responses to exercise/heat stress
[AD-A127855] N83-32299

HYDRAULIC EQUIPMENT
Analysis of experimental data on rolling of corrosion-resistant steel with hydraulic thrust
[BLL-M-35007-(5828.4)] N83-31806

HYDROCARBON FUELS
LOX/hydrocarbon fuel carbon formation and mixing data analysis
[NASA-CR-168066] N83-31886

HYDROCARBONS
Hydrocarbons from plants and trees
[DE83-002228] N83-31727
The ABAG biogenic emissions inventory project
[NASA-CR-166498] N83-32151

HYDROCHLORIC ACID
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A127765] N83-31755

HYDRODYNAMIC COEFFICIENTS
Daily flow statistics of Alaskan streams
[PB83-180133] N83-32166

HYDRODYNAMIC EQUATIONS
On thermally-driven movement of drops in microgravity conditions N83-31645

HYDRODYNAMICS
The fluid physics module: New possibilities and applications --- Spacelab payloads N83-31651
A variational approach to surface solitary waves
[AD-A127707] N83-32000

HYDROELECTRICITY
Department of Energy Civilian Research and Development Authorization Act for fiscal year 1984
[H-REPT-98-81] N83-32683

HYDROGEN
Hydrogen combustion results from the Sandia intermediate-scale (VGES) tank and the Sandia critical-tube-diameter test facility
[DE83-018744] N83-31761
Hydrogen combustion in aqueous foams
[DE83-002534] N83-31775
Kinetics of the reduction of calcium sulfate with carbon monoxide and hydrogen
[DE83-004983] N83-31780
Diffusion of hydrogen and deuterium in Zr-Al
[DE83-002214] N83-31829
Heat treating effects on environmental hydrogen embrittlement of nickel
[DE83-004921] N83-31844
Hydrogen and deuterium diffusion in vanadium alloys
[DE83-004964] N83-31845
Hydrogen and oxygen from water. Part 6: Quenching the effluent from a solar furnace
[AD-A127457] N83-32182
X-ray measurements of water-fog density
[DE83-005139] N83-32243
The effects of CO and HCN on pole-jump avoidance-escape behavior
[NASA-CR-166512] N83-32301
Simple theory for maximum H inventory and release: A new transport parameter
[DE82-014076] N83-32641

HYDROGEN EMBRITTLEMENT
The behaviour of welded high strength grain-refined steels under cathodic stress corrosion cracking conditions
[BLL-RISLEY-TR-4741-(9091.9F)] N83-31802
Activity of hydrogen in metal-hydrogen systems: Strontium, thorium-nitrogen and vandaium alloys
[DE83-004976] N83-31843

HYDROGEN IONS
Research on a new type of negative hydrogen ion source
[AD-A127947] N83-32525
High-brightness negative-hydrogen linear accelerator
[DE83-003565] N83-32545

HYDROGEN SULFIDE
Hydrogen and sulfur from hydrogen sulfide 2: Ambient temperature electrolysis using oxidation of hydrogen sulfide by air as the prime energy source
[AD-A127488] N83-31749
Early stages of sulfidation of iron and iron-chromium alloy in hydrogen sulfide
[DE83-004969] N83-31837

HYDROGENATION
Hydrogenation of carbon monoxide over ruthenium-rhenium on alumina catalysts
[DE83-004975] N83-31785

HYDROGEOLOGY
Orientation study of northern Arkansas. National uranium resource evaluation program. Hydrogeochemical and steam-sediment reconnaissance
[DE83-001214] N83-32156
Hydrogeochemical and stream sediment reconnaissance, orientation study of central Louisiana: National uranium resource evaluation program
[DE83-001217] N83-32157

HYDROGRAPHY
Methods of hydrographic surveying used by different countries
[AD-A128576] N83-32154

HYDROLOGY
LANDSAT-D investigations in snow hydrology --- Sierra Nevada Mountains
[E83-10382] N83-32135
LANDSAT-D investigations in snow hydrology --- Sierra Nevada Mountains, California
[E83-10388] N83-32141
Snow reflectance from thematic mapper
[E83-10391] N83-32144
Review and evaluation of paleohydrologic methodologies
[DE83-004572] N83-32159
Preliminary evaluation of the ground-water-flow system in the Twin Cities metropolitan area, Minnesota
[PB83-174599] N83-32162

HYDROLOGY MODELS
Review of ground-water flow and transport models in the unsaturated zone
[DE83-004256] N83-32158
Improving watershed-model accuracy by using digital topography
[PB83-178137] N83-32165

HYDROLYSIS
Hydrodesulfurization of chlorinized coal
[NASA-CASE-NPO-15304-1] N83-31743
Identification and cleavage of breakable single bonds by selecting oxidation, reduction and hydrolysis
[DE83-005312] N83-32624

HYDROSTATIC PRESSURE
Effect of pressure on the resistivity and Hall coefficient of amorphous metallic alloys
[DE83-005399] N83-32631

HYDROTHERMAL CRYSTAL GROWTH
An automatic monoellipsoidal mirror furnace facility for long-term crystal growth on the European Retrievable Carrier (EURECA) N83-31655

HYDROXYL RADICALS
Synthesis of hydroxy-terminated dinitropropyl acrylate polymers and improved characterization of hydroxy-terminated prepolymers
[AD-A127469] N83-31868

HYPERTHERMIA
Circadian growth hormone and prolactin blood concentration during a self-limited viral infection and artificial hyperthermia in man
[AD-A127501] N83-32289

I

ICE
The brittle to ductile transition in polycrystalline ice under tension
[AD-A127701] N83-32102
Design, construction, testing and evaluation of a residential ice storage air conditioning system
[AD-A128582] N83-32183

ICE FORMATION
Engine performance comparison associated with carburetor icing during aviation grade fuel and automotive grade fuel operation
[DOT/FAA/CT-82/110] N83-31604

IDAHO
Environmental evaluation of alternatives for long-term management of Defense high-level radioactive wastes at the Idaho Chemical Processing Plant
[DE83-002504] N83-32572

IDENTIFYING
Deterministic methods of seismic source identification
[AD-A127477] N83-32211

ILLUMINATION
Use of induced spatial incoherence for uniform illumination on laser fusion targets
[AD-A127612] N83-32050

IMAGE ANALYSIS
A translational registration system for LANDSAT image segments
[E83-10373] N83-32126

IMAGE ENHANCEMENT
Enhancing perceptibility of barely perceptible targets
[AD-A127569] N83-32582
Dual 7 pinhole tomography
[DE83-004589] N83-32591

IMAGE FURNACES
Development of an acoustic levitation device with a mirror furnace --- for spaceborne applications N83-31656
Minizone image furnace --- for reduced gravity experiments N83-31658

IMAGE MOTION COMPENSATION
Image motion compensation by area correlation and centroid tracking of solar surface features
[NASA-TM-82538] N83-32690

IMAGE PROCESSING
The GOES user's guide N83-31710
A translational registration system for LANDSAT image segments
[E83-10373] N83-32126
CNPQ/INPE LANDSAT system
[E83-10374] N83-32127
LANDSAT-D investigations in snow hydrology --- Sierra Nevada Mountains, California
[E83-10388] N83-32141
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration
[E83-10389] N83-32142
An application of a computer optical design program
[AD-A127857] N83-32375
Electronics Engineering Department Computer Program Newsletter no. 8: Image-Processing Computer Codes
[DE83-007768] N83-32392
Binocular shading and visual surface reconstruction
[AD-A127058] N83-32580
Enhancing perceptibility of barely perceptible targets
[AD-A127569] N83-32582
Intelligent interpretation of 3-D imagery
[AD-A127710] N83-32583

IMAGE RESOLUTION
A preliminary evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies
[E83-10383] N83-32136
Investigation of several aspects of LANDSAT-4 data quality
[E83-10390] N83-32143

IMAGING TECHNIQUES
Computerized ultrasonic scanning bridge for defect imaging: Composite materials
[DE83-001539] N83-31741
Multibeam single frequency synthetic aperture radar processor for imaging separate range swaths
[NASA-CASE-NPO-14525-2] N83-31918

Electronics Engineering Department Computer Program Newsletter no. 8: Image-Processing Computer Codes
[DE83-007768] N83-32392

IMIDES
Phosphorus-containing imide resins
[NASA-CASE-ARC-11368-1] N83-31854

IMPACT ACCELERATION
Evoked potential studies of the effects of impact acceleration on the motor nervous system
[AD-A127562] N83-32278

IMPACT TESTS
Structural element and real blade impact testing, volume 1
[AD-A127744] N83-31606
Structural element testing and real blade impact testing, volume 2
[AD-A127957] N83-31738

IMPURITIES
Magnetic susceptibility of scandium-hydrogen and lutetium-hydrogen solid-solution alloys from 2 to 300 deg K
[DE83-004786] N83-31846

INCINERATORS
Survey of foreign systems for incineration and energy recovery
[AD-A127461] N83-32181

INCLUSIONS
Thermal-gradient migration of brine inclusions in salt crystals
[DE83-004180] N83-32633

INCOHERENCE
Use of induced spatial incoherence for uniform illumination on laser fusion targets
[AD-A127612] N83-32050

INCOHERENT SCATTER RADAR
Aurora-region dynamics determined with the Chatanika radar
[AD-A127042] N83-32208
The MITHRAS: A program of simultaneous radar observations of the high-latitude auroral zone
[AD-A127016] N83-32220

INCOMPRESSIBLE FLOW
Analysis of gap heating due to stepped tiles in the shuttle thermal protection system
[NASA-TP-2209] N83-31713
Explicit smooth velocity kernels for vortex methods
[AD-A127781] N83-32007
Mixed finite element methods with applications to flow and other problems
[AD-A127751] N83-32008

INDEPENDENT VARIABLES
Some generalizations of the renewal process
[AD-A127522] N83-32431

INDEXES (DOCUMENTATION)
A catalog of fluidic C-format laminates
[AD-A128549] N83-31740
Annotated bibliography of USAARL (United States Army Aeromedical Research Laboratory) technical and letter reports, 1 June 1963 - 30 April 1983
[AD-A127451] N83-32292

INDIAN OCEAN
Tropical cyclone wind probability forecasting for the north Indian Ocean (WINDPIO)
[AD-A127130] N83-32233

INDIANA
Ground-water resources of the White River Basin, Hamilton and Tipton Counties, Indiana
[PB83-184309] N83-32169
Statistical analysis of the daily streamflow hydrograph and a probability distribution of the interarrival times of peak flows-application to Indiana
[PB83-187153] N83-32171

INDICATING INSTRUMENTS
Detecting monomethylhydrazine rocket fuel vapors with the MDA model 3060 autospot automatic toxic gas detector
[AD-A127512] N83-31722
Laser-based instrumentation for the detection of chemical agents
[DE83-003538] N83-32036

INDIUM ANTIMONIDES
Experiments on crystallization of semiconductors aboard Salyut 6: Soyuz orbital complex N83-31688
Fabricate indium-antimonide two-dimensional charge injection device array
[AD-A127638] N83-32618

INDOOR AIR POLLUTION
CB agent threat to atmosphere inside Navy aircraft
[AD-A127882] N83-31587

INDUCTANCE
Fault-current limiter using a superconducting coil
[DE83-003557] N83-31986

INDUSTRIAL ENERGY
Alternate fuels and energy sources for electric department: City of Tallahassee, Florida
[DE83-001694] N83-31889

INDUSTRIAL PLANTS
Flexible manufacturing system handbook. Volume 3: Buyer/user's guide
[AD-A127929] N83-31901
Flexible manufacturing system handbook. Volume 4. Appendices
[AD-A127930] N83-31902

INDUSTRIAL WASTES
Overview assessment of nuclear-waste management
[DE83-004472] N83-32574

INDUSTRIES
Laser applications present and future: Prospects for significant occupational safety and health impact
[PB83-184507] N83-32066
NBS (National Bureau of Standards) and industrial biotechnology: Instrumentation and associated measurement needs
[PB83-191114] N83-32285

INELASTIC SCATTERING
Testing quantum chromodynamics
[DE83-004391] N83-32555

INEQUALITIES
A condition number for differentiable convex inequalities
[AD-A127941] N83-32414

INERTIAL CONFINEMENT FUSION
Method and apparatus for producing gas-filled hollow spheres — target pellets for inertial confinement fusion
[NASA-CASE-NPO-14596-3] N83-31896
Self-similar solutions of hydrodynamic equations for expanding layer with boundary condition specified by differential equation N83-32481
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia N83-32482
Propagation of light ion beam micro- and macrostabilities of rotating ion layer N83-32483

INERTIAL FUSION (REACTOR)
The Antares facility for inertial-fusion experiments: Status and plans
[DE83-003536] N83-32608

INERTIAL NAVIGATION
Wellborne inertial navigation system
[DE83-004012] N83-31593
Intertial survey application to civil works
[AD-A127508] N83-32153

INERTIAL PLATFORMS
Intertial survey application to civil works
[AD-A127508] N83-32153

INFECTIOUS DISEASES
CB agent threat to atmosphere inside Navy aircraft
[AD-A127882] N83-31587
Circadian growth hormone and prolactin blood concentration during a self-limited viral infection and artificial hyperthermia in man
[AD-A127501] N83-32289

INFERENCE
Inference on parameters in a linear model, a review of recent results
[AD-A127486] N83-32429
Bayesian models for response surfaces of uncertain functional form
[AD-A127703] N83-32465
FUN.STAT quantile approach to two sample statistical data analysis
[AD-A127672] N83-32467

INFORMATION DISSEMINATION
Uses of information discussed N83-32652
Streamlining flow of scientific and technical information N83-32653
NASA publications guide
[NASA-SP-7047] N83-32671
Technical Information Clearinghouse Fund Act of 1983
[H-REPT-98-94] N83-32685
Includes information about the Scientific Committee NLR-NIVR, internation colaboration in the framework of AGARD, ETW and Garteur and also about the colaboration with Indonesia N83-32705

INFORMATION MANAGEMENT
Uses of information discussed N83-32652
Streamlining flow of scientific and technical information N83-32653

INFORMATION RETRIEVAL
The CRT display evaluation: The multidimensional rating of CRT-generated displays
[DE83-003699] N83-31979

INFORMATION SYSTEMS
An approach for implementing a microcomputer based report origination system in the Ada programming language
[AD-A128028] N83-32383
Better use of information technology can reduce the burden of federal paperwork
[GAO/GGD-83-39] N83-32655

INFORMATION THEORY
Authorizing appropriations to the National Science Foundation
[H-REPT-98-73] N83-32684

INFRARED ASTRONOMY
Activities in astronomy
[ISBN-0-902553-23-2] N83-32692

INFRARED DETECTORS
Evaluation of infrared target discrimination algorithms
[AD-A128283] N83-32587

INFRARED IMAGERY
Comparison of modelled and empirical atmospheric propagation data
[E83-10398] N83-32146

INFRARED RADIATION
Atmospheric temperature profiles from Earth limb infrared measurements
[AD-A127536] N83-32214

INFRARED RADIOMETERS
Accurate, practical simulation of satellite infrared radiometer spectral data
[DE83-002506] N83-32221

INFRARED SPECTRA
Infrared spectra of CO adsorbed at low temperatures on Ni
[DE83-001568] N83-31765

INFRARED TRACKING
Final Tactical Decision Aid (FTDA) for infrared (8-12 micrometers) systems, manual version. Appendix B: Insolation and sky radiation tables
[AD-A127853] N83-32699

INGESTION (ENGINES)
Scaling laws for vortex induced debris ingestion into air intakes
[BAE-KRS-N-GEN-274] N83-31575

INHIBITORS
Review of corrosion inhibitors: Theory and practice
[PB83-181487] N83-31853

INITIATORS (EXPLOSIVES)
Flight termination system equipment. Volume 4: Safing and arming devices, initiators, and shaped charges
[AD-A127480] N83-31707
Chemistry of glass-ceramic/metal bonding for header applications. 1: Effect of treatments on Inconel 718 and Hasteloy C-276 metallic surfaces — on actuators and initiators
[DE83-003367] N83-32068

INJECTION
The trajectory of a heated, buoyant jet in a non-uniform cross-flow
[BAE-KAD-GEN-N-2868] N83-31994
Preliminary investigation of interconnected systems interactions for the safety injection system of Indian Point-3
[DE83-009172] N83-32451

INJECTION MOLDING
Computer-aided design and fabrication of molds and computer control of injection molding
[PB83-187955] N83-31914

INJECTORS
New accelerators in high-energy physics
[DE83-002817] N83-32570

INORGANIC CHEMISTRY
Metal clusters and extended metal-metal bonding in metal oxide systems
[DE83-003793] N83-31821

INPUT/OUTPUT ROUTINES
Illinois I/O register to FASTBUS interface
[DE83-007330] N83-32389
User's manual for training device cost model 'TRACOM'
[AD-A128355] N83-32664
User's manual for Cost Proposal Evaluation Program (CPEP)
[AD-A128356] N83-32665

INSTRUMENT ERRORS
Contact-potential and surface-charge effects in atmospheric-electrical instrumentation
[NASA-CR-172834] N83-32027

INSTRUMENT PACKAGES
Automation of hydrophysical research N83-32125

INSULATION
Technology for energy-efficient buildings
[DE83-005927] N83-31905
Composite coaxial telecommunications cable
[AD-A127810] N83-31969
Equipment qualification research test of electrical cable with factor splices and insulation rework: Test no. 2, report no. 1
[DE83-002165] N83-31980
Electrical-breakdown characteristics and testing of high-voltage XLPE- and EPR-insulated cables
[DE83-000721] N83-31989
Urea-formaldehyde foam insulation
[GPO-12-485] N83-32191

INTEGRAL CALCULUS
The background to Cauchy's definition of the integral N83-32326

INTEGRAL EQUATIONS
A nonlinear integral equation occuring in a singular free boundary problem
[AD-A127940] N83-32413

INTEGRALS
Integral operators N83-32325
The background to Cauchy's definition of the integral N83-32326
Malliavin's calculus and stochastic integral representations of functionals of diffusion processes
[AD-A127726] N83-32427

INTEGRATED CIRCUITS
Research in VLSI systems. Heuristic programming project and VLSI theory project: A fast turn around facility for Very Large Scale Integration (VLSI)
[AD-A127153] N83-31961
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 4: Test generation
[AD-A127985] N83-31967
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 1: Executive summary
[AD-A127984] N83-31968
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 8: Fault simulation
[AD-A128019] N83-31971
A simple multifunction discriminator for multichannel triggers
[DE83-004193] N83-31981

INTELLIGIBILITY
Controlled test procedures for using intervocalic consonauts to assess speech intelligibility: A feasibility study
[AD-A127953] N83-31941

INTERACTIONS
Recent developments in the investigations on the gas-surface interactions N83-32499

INTERACTIVE CONTROL
Software error data collection and categorization N83-32364

INTERCONTINENTAL BALLISTIC MISSILES
Detecting monomethylhydrazine rocket fuel vapors with the MDA model 3060 autospot automatic toxic gas detector
[AD-A127512] N83-31722

INTERFACES
Interface character of aluminum-graphite metal matrix composites
[AD-A127590] N83-31736
General-purpose stepping motor-encoder positioning subsystem with standard asychronous serial-line interface
[DE83-004634] N83-31987
Universal microcomputer interface for data acquisition
[AD-A127875] N83-32346
User interface design of software tool system as a technology transfer vehicle N83-32362
Illinois I/O register to FASTBUS interface
[DE83-007330] N83-32389

INTERFACIAL TENSION
Thermocapillary migration of bubbles in liquids showing relaxation of surface tension N83-31643
Bubble motion under reduced gravity N83-31644
Study of the surface tension minimum of aqueous alcohol solutions and movements at the air-solution interface N83-31668
The influence on the Marangoni effect of a surface tension minimum as a function of temperature in microgravity conditions N83-31669
Free-surface vibration of a floating zone induced by surface tension driven oscillating flow N83-31670
Influence of geometry on oscillatory Marangoni flows N83-31672
Influence of surface tension minimum on surface and buoyancy driven flows in Stokes regime N83-31673
Buoyancy-thermocapillary convection: The role of interfacial deformation N83-31674
The breaking of axisymmetric noncylindrical liquid bridges N83-31678

INTERFEROMETERS
Interferometric angle monitor
[NASA-CASE-GSC-12614-1] N83-32577

INTERGRANULAR CORROSION
Study of intergranular embrittlement in Fe-12Mn alloys
[DE83-002623] N83-31835

INTERMOLECULAR FORCES
Unimolecular reactions of nitrites and nitrates
[AD-A127825] N83-32528

INTERNAL FRICTION
Alloy with enhanced damping properties
[BLL-M-34953-(5828.4)] N83-31805

INTERNATIONAL COOPERATION
Policy and organization: The next step in the National Space Program
[AD-A127012] N83-31704
R&D acitivities of Belorussian SSR Academy of Sciences described N83-32654
Includes information about the Scientific Committee NLR-NIVR, internation colaboration in the framework of AGARD, ETW and Garteur and also about the colaboration with Indonesia N83-32705

INTERPLANETARY MEDIUM
Interaction of solar wind with magnetosphere of Venus N83-31627

INTERPLANETARY TRAJECTORIES
Interplanetary mission designs by multiple Earth-Venus-Jupiter swingbys N83-32489

INTERPOLATION
Bivariate cardinal interpolation by splines on a three-direction mesh
[AD-A127939] N83-32412

INTERPROCESSOR COMMUNICATION
Automation of electric power system (selected articles)
[AD-A127839] N83-32055
Network management research
[AD-A127667] N83-32398

INVARIANCE
Invariants of a maximal unipotent subgroup of a semi-simple group N83-32330

INVENTORY MANAGEMENT
POM (Program Objective Memorandum) FY-85 BP 1500 cost growth and leadtime adjustments: Research results
[AD-A128522] N83-32667

INVERTERS
Adaptive reference voltage generator for firing angle control of line-commutated inverters
[NASA-CASE-MFS-25215-1] N83-31953

INVISCID FLOW
Rotational and irrotational freestream disturbances interacting inviscidly with a semi-infinite plate
[AD-A127009] N83-31998
Explicit smooth velocity kernels for vortex methods
[AD-A127781] N83-32007
Generation of orthogonal, boby-fitted grids using potential flow solution by the panel method N83-32485
Lift generation due to vortex shedding N83-32488

IODIDES
Recent developments in thick mercuric iodide spectrometers
[DE83-003007] N83-32037

IODINE
Energy disposal in electronically excited halogens and oxygen
[AD-A127585] N83-32051

IODINE LASERS
Solar-simulator-pumped atomic iodine laser kinetics
[NASA-TP-2182] N83-32044

ION BEAMS
Ion-bombardment effects on the fatigue life of stainless steel under simulated fusion first-wall conditions
[DE83-007145] N83-31827
Self-semilar solutions of hydrodynamic equations for expanding layer with boundary condition specified by differential equation N83-32481
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia N83-32482
Propagation of light ion beam micro- and macrostabilities of rotating ion layer N83-32483

ION DENSITY (CONCENTRATION)
Differential rain and snow scavenging efficiency implied by ionic concentration differences
[DE83-006304] N83-32245

ION IMPLANTATION
Electrocatalysis on ion-implanted electrodes
[DE82-015768] N83-31787
The 4th Symposium on Applied Surface Analysis: Parts 1 and 2
[AD-A127109] N83-32615

ION IRRADIATION
Influence of ion radiation on the magnetic properties of ferrimagnetic films
[BMFT-FB-T-83-048] N83-32644

IONIC CRYSTALS
Formation energy of point defects in free surfaces and grain boundaries in MgO
[DE83-008524] N83-32622

IONIZATION CHAMBERS
Use of nitrogen laser for observation of space-charge effects in drift chambers
[DE83-004416] N83-32065

IONIZATION CROSS SECTIONS
Theory of collision-induced ionization of adsorbed species on solid surfaces in the presence of laser radiation
[AD-A128317] N83-32059

IONIZING RADIATION
Ideas on the unification of radiobiological theories
[DE83-004188] N83-32283

IONOSPHERIC DISTURBANCES
Variation of equatorial F-region irregularity parameters as a function of solar activity
[AD-A127895] N83-32209

IONOSPHERIC ELECTRON DENSITY
Rocketborne measurements of optical emissions from the auroral E-layer
[AD-A127517] N83-32213

IONOSPHERIC PROPAGATION
Acoustic and gravity waves in the neutral atmosphere and the ionosphere, generated by severe storms
[NASA-CR-170834] N83-32205

IOWA
Comparison of CRD, APU, and state models for Iowa corn and soybeans and North Dakota barley and spring wheat
[E83-10379] N83-32132
Regional tectonics and seismicity of southwestern Iowa
[DE83-900978] N83-32226

IPAD
Structures and Dynamics Division: Research and technology plans for FY 1983 and accomplishments for FY 1982
[NASA-TM-85661] N83-32095

IRON
Use of sleeved rolls in a blooming mill
[BMFT-FB-T-83-042] N83-31908
Bending moments in oxides on the surface of particles of dispersed iron
[BLL-M-34936-(5828.4)] N83-32085

IRON ALLOYS
Early stages of sulfidation of iron and iron-chromium alloy in hydrogen sulfide
[DE83-004969] N83-31837
The development and evaluation of point defect models for the growth of passive films on single crystal, polycrystalline, and amorphous metal surfaces
[AD-A128333] N83-32619

IRON COMPOUNDS
Motive forces of structural changes in ferrosilicon during heating after slight deformations
[BLL-M-35039-(5828.4)] N83-31799

IRRADIANCE
Self-study manual on optical radiation measurements. Part 3. Applications, chapter 1. Measurement of solar terrestrial spectral irradiance in the ozone cut-off region
[PB83-184382] N83-32231

IRRADIATION
Effects of microstructure on light ion irradiation creep in nickel
[DE83-003467] N83-31831
Use of induced spatial incoherence for uniform illumination on laser fusion targets
[AD-A127612] N83-32050
Beta and low-energy photon irradiation of several commercial phosphors
[DE83-006606] N83-32531

IRREVERSIBLE PROCESSES
Thermodynamics of irreversible processes in molten salts: Problems of interdiffusion measurements under microgravity N83-31662
Irreversible cooperative processes on lattices
[DE83-004795] N83-31878

ISCHEMIA
Detection of retinal ischemia prior to blackout by electrical evoked cortical responses
[AD-A126855] N83-32288

ISOTHERMAL PROCESSES
Isothermal gradient heat-pipes space furnace (500 to 1000 deg C) N83-31659

ISOTOPE EFFECT
Rarefaction phenomena in gas ans isotope separation N83-32501

ISOTOPE SEPARATION
Rarefaction phenomena in gas ans isotope separation N83-32501

ISOTOPES
Mechanisms, distribution and frequency of groundwater recharge in upland areas of western North Dakota
[PB83-182121] N83-32168
Atomic-vapor-laser isotope separation
[DE83-003253] N83-32530

ITERATION
Microstructural characterization of nuclear-waste ceramics
[DE83-000362] N83-31860
An iterative method for solving finite difference approximations to Stokes equations
[AD-A127704] N83-32415

ITERATIVE SOLUTION
An iterative method for solving finite difference approximations to Stokes equations
[AD-A127704] N83-32415

J

JAPANESE SPACE PROGRAM
Japanese program review of material processing in space N83-31640
JET FLOW
The trajectory of a heated, buoyant jet in a non-uniform cross-flow
[BAE-KAD-GEN-N-2868] N83-31994
JOINING
Preliminary investigation of interconnected systems interactions for the safety injection system of Indian Point-3
[DE83-009172] N83-32451
JOINTS (JUNCTIONS)
Improved materials for composite and adhesive joints
[AD-A128569] N83-31739
JOSEPHSON JUNCTIONS
Applications of Josephson junction SQUIDs Superconducting Quantum Interference Device) and Arrays
[AD-A127135] N83-31962
Fundamental limits on SQUID technology
[DE83-002561] N83-32629
JOULE-THOMSON EFFECT
Cycling Joule Thomson refrigerator
[NASA-CASE-NPO-15251-1] N83-31897
JUPITER (PLANET)
Interplanetary mission designs by multiple Earth-Venus-Jupiter swingbys N83-32489

K

KALMAN FILTERS
Deconvolution of noisy transient signals: A Kalman filtering application
[DE83-030849] N83-31950
Fast Kalman filtering for ARMA (autoregressive moving average) processes: Fixed point implementation
[AD-A126994] N83-32407
KINEMATICS
Experimental observations of shear patterns in direct shear tests
[PB83-187351] N83-31917
Interpretations of the OSCAR data for reactive-gas scavenging
[DE83-003597] N83-32195
KINETIC ENERGY
Turbulent combustion rate in a spark ignition engine: Some comparisons between model predictions and experiments
[DE83-003205] N83-31767
Millimeter microwave emission by use of plasma produced electrons orbiting a positively-charged wire
[AD-A127240] N83-32046
KINETICS
Characteristics of thermoluminescence glow curves for materials exhibiting more than one glow peak
[DE83-004602] N83-31778
Solar-simulator-pumped atomic iodine laser kinetics
[NASA-TP-2182] N83-32044
KNUDSEN FLOW
On the interpolation formula based upon the asymptotic solution to the kinetic model equation N83-32495
KNUDSEN GAGES
Couette flow in continuum to free molecular regime N83-32493
KRYPTON
Ion time-of-flight spectroscopy: Krypton charge-state spectra as a function of photon excitation energy near the K edge
[DE83-002221] N83-32550
KWIC INDEXES
Keywork-in-context index to computers in dentistry
[PB83-186361] N83-32674

L

LABOR
Better results from development of technical equipment N83-32649
LABORATORIES
Multiprogram Laboratory Panel Energy Research Advisory Board. Volume 2: Support studies
[DE83-002694] N83-32668
LAGRANGIAN EQUILIBRIUM POINTS
Optimization of low thrust trajectories for collinear Lagrange point mission N83-32490
LAGUERRE FUNCTIONS
Significance points for some tests of uniformity on the sphere, revision
[AD-A128027] N83-32435
LAKES
Metal input and mobilization in 2 acid-stressed lake watersheds in Maine
[PB83-182022] N83-32201
LAMINAR FLOW
Asymptotic flame theory with complex chemistry
[DE83-002077] N83-31774
LAMINATES
Standard tests for toughened resin composites, revised edition
[NASA-RP-1092-REV] N83-31730
A catalog of fluidic C-format laminates
[AD-A128549] N83-31740
Roll-bonded 300M/1010 steel metal-metal laminates: Forgeability, toughness, fatigue, and stress corrosion
[AD-A127541] N83-31826
LAND
Low level convergence and the prediction of convective precipitation
[AD-A127673] N83-32236
LANDFILLS
Biological intrusion barriers for large-volume waste-disposal sites
[DE83-002061] N83-32571
LANDFORMS
Natural landmarks survey of the islands of the Pacific
[PB83-182501] N83-32161
LANDING SITES
Evaluation of design criterion of the strategic expeditionary landing field
[AD-A128323] N83-31614
LANDMARKS
Natural landmarks survey of the islands of the Pacific
[PB83-182501] N83-32161
LANDSAT 4
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E83-10373] N83-32128
A preliminary evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies
[E83-10383] N83-32136
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration
[E83-10389] N83-32142
Investigation of several aspects of LANDSAT-4 data quality
[E83-10390] N83-32143
Snow reflectance from thematic mapper
[E83-10391] N83-32144
Comparison of modelled and empirical atmospheric propagation data
[E83-10398] N83-32146
LANGUAGES
Controlled test procedures for using intervocalic consonauts to assess speech intelligibility: A feasibility study
[AD-A127953] N83-31941
LAPLACE TRANSFORMATION
Evaluation of the total time in system in a preempt/resume priority quene via a modified Lindley process
[AD-A127814] N83-32403
LARGE SCALE INTEGRATION
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 4: Test generation
[AD-A127985] N83-31967
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 1: Executive summary
[AD-A127984] N83-31968
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 8: Fault simulation
[AD-A128019] N83-31971
LARGE SPACE STRUCTURES
Zaytsev comments on modular orbital stations N83-31618
Development of deployable structures for large space platform systems. Volume 1: Executive summary
[NASA-CR-170838] N83-31632
Actuator-placement considerations for the control of large space structures
[AD-A128241] N83-31720
Beam connector apparatus and assembly
[NASA-CASE-MFS-25134-1] N83-31895
LASER APPLICATIONS
An effect of turbulent diffusion on the glow discharge-to-arc transition
[AD-A128553] N83-32009
Laser-based instrumentation for the detection of chemical agents
[DE83-003538] N83-32036
Laser applications present and future: Prospects for significant occupational safety and health impact
[PB83-184507] N83-32066
Atomic-vapor-laser isotope separation
[DE83-003253] N83-32530
Three laser scanning instruments for automatic surface inspection N83-32578
LASER DAMAGE
The problems of protection against optical radiation
[BR88714] N83-32287
LASER FUSION
Laser-plasma interaction experiments and diagnostics at NRL (Naval Research Laboratory)
[AD-A128254] N83-32060
The Antares facility for inertial-fusion experiments: Status and plans
[DE83-003536] N83-32608
LASER HEATING
Research on a new type of negative hydrogen ion source
[AD-A127947] N83-32525
LASER INTERFEROMETRY
Density measurements of a free jet by a laser differential interferometer N83-32497
LASER OUTPUTS
Time resolved study of primary decomposition process for nitro paraffins and nitramines
[AD-A127660] N83-31749
Electromagnetic mirror dynamics
[AD-A127515] N83-31938
Analysis of laser-turbulence utilizing a video tape recorder and digital storage oscilloscope
[AD-A127859] N83-32049
Use of induced spatial incoherence for uniform illumination on laser fusion targets
[AD-A127612] N83-32050
Surface acoustic wave non-linear interactions in lithium niobate
[AD-A127570] N83-32052
Theory of collision-induced ionization of adsorbed species on solid surfaces in the presence of laser radiation
[AD-A128317] N83-32059
Unimolecular reactions of nitrites and nitrates
[AD-A127825] N83-32528
Laser-induced fluorescence detection of large organic molecules
[DE83-000353] N83-32540
Generation of enhanced-scalelength plasmas and Zeeman study of magnetic fields
[AD-A127951] N83-32596
LASER PLASMA INTERACTIONS
The Antares facility for inertial-fusion experiments: Status and plans
[DE83-003536] N83-32608
LASER PLASMAS
Laser-plasma interaction experiments and diagnostics at NRL (Naval Research Laboratory)
[AD-A128254] N83-32060
Generation of enhanced-scalelength plasmas and Zeeman study of magnetic fields
[AD-A127951] N83-32596
LASER PUMPING
Solar-simulator-pumped atomic iodine laser kinetics
[NASA-TP-2182] N83-32044
High efficiency picosecond pulse generation in the 675-930 NM region from a dye laser synchronously pumped by an argon-ion laser
[AD-A128033] N83-32058
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible
[AD-A128534] N83-32062
Research studies on radiative collisional processes
[AD-A128533] N83-32509
LASER TARGET DESIGNATORS
Intelligent interpretation of 3-D imagery
[AD-A127710] N83-32583
LASER TARGET INTERACTIONS
Laser-plasma interaction experiments and diagnostics at NRL (Naval Research Laboratory)
[AD-A128254] N83-32060
LASER WEAPONS
Jurist comments on legal questions regarding US shuttle N83-31631
LASERS
Characterization of internal sales by laser desorption mass spectrometry
[AD-A127916] N83-31746
Automation of electric power system (selected articles)
[AD-A127839] N83-32055
LATIN SQUARE METHOD
Two orthogonal (v/2)x2v F-rectangle for all even v
[AD-A127948] N83-32433

LATITUDE
A comparison of the MSIS and Jacchia-70 models with measured atmospheric density data in the 120 to 200 km altitude range
[AD-A128005] N83-32216
LATTICE VIBRATIONS
Dynamic applications of piezoelectric crystals. Part 2: Theoretical studies N83-32084
LATTICES (MATHEMATICS)
Orthomorphisms N83-32318
Duality in the theory of Banach lattices N83-32323
Some recent results on positive groups and semi-groups N83-32324
Some lattice properties of the space L2 N83-32327
LAUNCH VEHICLES
National Aeronautics and Space Administration research and development N83-32679
Space flight, control and data communications N83-32681
LEACHING
Recovery of precious metals from materials containing selenium, tellurium, arsenic and antimony
[BMFT-FB-T-83-050] N83-31848
LEAD (METAL)
Measurements of diffusion coefficient of copper in liquid lead in microgravity by the grain boundary grooving technique N83-31684
LEAD ALLOYS
Ostwald ripening and solidification behavior of near monotectic ZN-PB alloys N83-31646
The effect of the natural convection on the solidification of metallic alloys N83-31687
Solidification of PbSn alloys under microgravity conditions N83-31701
Directional crystallization of Pb Te under microgravity conditions N83-31703
Production of an aluminium-lead alloy in micro-gravity
[BLL-M-28685-(5828.4)] N83-31807
LEADERSHIP
Women at sea: Welcome aboard
[AD-A128602] N83-32646
LEADING EDGE FLAPS
An experimental study of pressures on 60 deg Delta wings with leading edge vortex flaps
[NASA-CR-172833] N83-31576
LEADING EDGES
An experimental study of pressures on 60 deg Delta wings with leading edge vortex flaps
[NASA-CR-172833] N83-31576
Wind-tunnel investigation of leading-edge thrust on arrow wings in supersonic flow
[NASA-TP-2167] N83-31577
Rotational and irrotational freestream disturbances interacting inviscidly with a semi-infinite plate
[AD-A127009] N83-31998
Numerical Aerodynamic Simulation (NAS)
[NASA-TM-84386] N83-32397
LEAKAGE
Detecting monomethylhydrazine rocket fuel vapors with the MDA model 3060 autospot automatic toxic gas detector
[AD-A127512] N83-31722
Ambient and cryogenic temperature testing of a 32-channel CMOS multiplexer
[NASA-TM-84385] N83-31957
Development of a leak location system for use on underground electric power transmission cable
[DE83-900533] N83-31983
Simplified methods for the inelastic analysis and reliability assessment of stiffened shells --- for nuclear power plant containment vessels
[DE83-004966] N83-32100
LEARNING
The role of a mental model in learning to operate a device
[AD-A127281] N83-32305
An expert distributed robotics system with comprehension and learning abilities in the aircraft flight domain
[AD-A127739] N83-32401
LEAST SQUARES METHOD
Fault diagnosis of nonlinear analog circuits, volume 5. HAFDIC: A program for generating a hard fault dictionary
[AD-A127021] N83-31958
Least absolute deviations regression
[DE83-004424] N83-32456
LEBESGUE THEOREM
Orthomorphisms and the Radon-Nikodym Theorem revisited N83-32321
On the Radon-Nikodym Theorem N83-32322
LEGENDRE FUNCTIONS
MIE scattering theory for particle sizing interferometry with the dual beam laser velocimeter
[DE83-009249] N83-32063
LENS DESIGN
An application of a computer optical design program
[AD-A127857] N83-32375
LENSES
Interferometric angle monitor
[NASA-CASE-GSC-12614-1] N83-32577
LEVITATION
Containerless high temperature property measurements by atomic fluorescence
[NASA-CR-170835] N83-32522
LIBRARIES
SESAME '83: Report on the Los Alamos equation-of-state library
[DE83-008283] N83-32388
LIFE (DURABILITY)
Salyut-7 passes one year in orbit mark N83-31620
Space station needs, attributes and architectural options study commercialization working group briefing
[NASA-CR-172948] N83-31715
Relationship of an in-situ test facility to a deep geologic repository for high-level nuclear waste, task 4
[DE83-901818] N83-31726
A survey of software quality assurance methods and an evaluation of software quality assurance at Fleet Material Support Office
[AD-A127676] N83-32378
POD-HOS (Performances Oriented Design-Higher Order Software) interfaces: An examination of AXES/POD relationships and other issues
[AD-A128301] N83-32384
Quasiresonance of long life
[AD-A127763] N83-32442
Biological intrusion barriers for large-volume waste-disposal sites
[DE83-002061] N83-32571
LIFE CYCLE COSTS
An economic analysis of alternative paving materials
[AD-A127534] N83-31903
User's manual for training device cost model 'TRACOM'
[AD-A128355] N83-32664
User's manual for Cost Proposal Evaluation Program (CPEP)
[AD-A128356] N83-32665
Advanced single permanent magnet axipolar ironless stator ac motor for electric passenger vehicles
[NASA-CR-167974] N83-32687
LIFT
Lift generation due to vortex shedding N83-32488
LIFT DEVICES
Safety engineering: KTA code of practice. Lifting mechanisms in nuclear plant
[BLL-CE-TRANS-7880-(9022.09)] N83-31898
LIFTING BODIES
Aerodynamics of airfoils subject to three-dimensional periodic gusts
[AD-A127043] N83-31581
LIGANDS
Bis(bipyrazine)ruthenium(II) complexes: Characterization, spectroscopy and electrochemistry
[AD-A127500] N83-31751
LIGHT IONS
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia N83-32482
Propagation of light ion beam micro- and macrostabilities of rotating ion layer N83-32483
LIGHT SCATTERING
MIE scattering theory for particle sizing interferometry with the dual beam laser velocimeter
[DE83-009249] N83-32063
A light-scattering system to measure cavitation nuclei: Analysis and calibration
[AD-A127946] N83-32589
LIGHT SOURCES
Photoelectron spectrometer for high-resolution angular resolved studies
[DE83-008687] N83-32033
LIMESTONE
Tension cutoff and parameter identification for the viscoplastic cap model
[AD-A128304] N83-32217
LIMITER CIRCUITS
Fault-current limiter using a superconducting coil
[DE83-003557] N83-31986
LIMITS (MATHEMATICS)
Limit laws for the maximum of weighted and shifted I.I.D. random variables
[AD-A128359] N83-32438
LINEAR ACCELERATORS
Research needs of the new accelerator technologies
[DE83-000518] N83-32541
Collective effect accelerators and the challenge of attaining ultra-high energies
[DE83-002568] N83-32542
High-brightness negative-hydrogen linear accelerator
[DE83-003565] N83-32545
LINEAR EQUATIONS
Solution of systems of complex linear equations in the L infinity norm with constraints on the unknowns
[AD-A127883] N83-32410
LINEAR PREDICTION
Classical linear-control analysis applied to business-cycle dynamics and stability
[NASA-TM-84366] N83-32876
LINEAR SYSTEMS
A new algorithm for the solution of optimal control commutative bilinear system
[RR-212] N83-32393
Inference on parameters in a linear model, a review of recent results
[AD-A127486] N83-32429
LINEAR TRANSFORMATIONS
A statistical approach to zonal polynominals
[AD-A127624] N83-32418
LINEARITY
Linear magnetic bearing
[NASA-CASE-GSC-12517-1] N83-32067
Frequency response of finite-aperature sample-and-hold systems
[DE83-002279] N83-32348
LIQUEFACTION
Pacific Northwest Regional Biomass Program
[PB83-188623] N83-31893
LIQUID BEARINGS
Evaluation of outer race tilt and lubrication on ball wear and SSME bearing life reductions
[NASA-CR-170836] N83-32069
LIQUID CRYSTALS
Structure and phase transitions of liquid crystals
[AD-A127573] N83-32617
LIQUID FLOW
Heat transfer rate of looped type heat pipes using water and Nak as working fluid under liquid phase flow N83-32508
Rheology via nonequilibrium molecular dynamics
[DE83-004302] N83-32558
LIQUID HELIUM 2
Remarks on thermal properties of rotating superfluid helium in a gravitational field N83-32502
Large scale superfluid practice
[DE83-001563] N83-32513
LIQUID METALS
Bending moments in oxides on the surface of particles of dispersed iron
[BLL-M-34936-(5828.4)] N83-32085
LIQUID OXYGEN
LOX/hydrocarbon fuel carbon formation and mixing data analysis
[NASA-CR-168066] N83-31886
LIQUID PHASE EPITAXY
Reconstruction by multidirectional holographic interferometry of the concentration field in a supersaturated solution near a growing NaClO3 crystal N83-31660
GaP/Al-x/Ga-1-x/P heterojunction bipolar junction transistor for high-temperature electronic applications
[DE83-001267] N83-31977
LIQUID PHASES
Low-gravity experiments on Liquid Phase Miscibility Gap (LPMG) alloys: Materials Experiments Assembly (MEA) N83-31685
An analysis of the driving forces in liquid phase sintering N83-31691
LIQUID-SOLID INTERFACES
Convection-Marangoni effects in solidification-microgravity N83-31681
Convection effects at solid-liquid interfaces: Influence of gravity N83-31686
LIQUID-VAPOR INTERFACES
Studies on condensation heat transfer in two-phase closed thermosyphons N83-32505
LIQUIDS
System for monitoring physical characteristics of fluids
[NASA-CASE-NPO-15400-1] N83-31993
LISP (PROGRAMMING LANGUAGE)
Notes on the conversion of logLisp from Rutgers/UCI-Lisp to interLisp
[AD-A127718] N83-32380
LITHIUM COMPOUNDS
Effects of irradiation on ceramics for fusion-reactor applications
[DE83-009468] N83-31872
Surface acoustic wave non-linear interactions in lithium niobate
[AD-A127570] N83-32052
LITHIUM FLUORIDES
Electroplating of refractory metals and alloys from fluoride melt
[AD-A127116] N83-31819

LITHIUM NIOBATES
Composition and electrical property relationships in polycrystalline inorganic materials
[AD-A127458] N83-31750
LOAD DISTRIBUTION (FORCES)
Optimum design of stiffened plates using the finite element method
[AD-A128556] N83-32110
Simplified analysis of shells with local, impulsive loads
[DE83-003791] N83-32119
Influence of centering forces on IFR hose instability
[DE83-006719] N83-32536
LOADS (FORCES)
Large-scale experiments on turbulent flame and pressure development
[PB83-177840] N83-31791
IBEX foilies diode experiments
[DE83-009185] N83-31976
Negative phase sequence recorder based on a single chip microcomputer
[PB83-184689] N83-32043
LOGIC CIRCUITS
Adaptive reference voltage generator for firing angle control of line-commutated inverters
[NASA-CASE-MFS-25215-1] N83-31953
Versatile secondary trigger for a multi-detector system
[DE83-04414] N83-31982
LOGISTICS
Study of the causes of unnecessary removals of avionic equipment
[AD-A127546] N83-31570
LOGISTICS MANAGEMENT
Building and operating the logistics composite model (LCM) for new weapon systems, part A
[AD-A127538] N83-32662
POM (Program Objective Memorandum) FY-85 BP 1500 cost growth and leadtime adjustments: Research results
[AD-A128522] N83-32667
LONG DURATION EXPOSURE FACILITY
LDEF experiments: Crystal growth by a solute diffusion process N83-31664
LONG DURATION SPACE FLIGHT
Salyut-7 passes one year in orbit mark N83-31620
Ryumin interviewed on Salyut experiments N83-31621
Peculiarities in formation of Arabidopsis Thaliana (L.) Heynh, generative organs under space flight conditions
[NASA-TM-77263] N83-32277
LONG TERM EFFECTS
Relevance of biotic pathways to the long-term regulation of nuclear-waste disposal. Topical Report on reference western arid low-level sites
[DE83-002575] N83-32576
LOOP ANTENNAS
Measured characteristics of multi-gap loop and asymptotic conical dipole electromagnetic field sensors
[AD-A127617] N83-31974
LOOPS
Heat transfer rate of looped type heat pipes using water and Nak as working fluid under liquid phase flow N83-32508
LOW CARBON STEELS
Suitability of low-carbon, ferritic-martensitic steels for cold heading of fastener components
[BLL-M-34972-(5828.4)] N83-31813
LOW PRESSURE
Low-pressure transfer operations
[DE83-003443] N83-32011
LOW TEMPERATURE
Infrared spectra of CO adsorbed at low temperatures on Ni
[DE83-001568] N83-31765
Magnetic susceptibility of scandium-hydrogen and lutetium-hydrogen solid-solution alloys from 2 to 300 deg K
[DE83-004786] N83-31846
LOWER CALIFORNIA (MEXICO)
Revised update and retrieval system for the calcofi oceanographic data file
[PB83-189464] N83-32675
LUBRICATING OILS
Spectrometer sensitivity investigations on the spectrometric oil analysis program
[AD-A127969] N83-31752
LUBRICATION
Evaluation of outer race tilt and lubrication on ball wear and SSME bearing life reductions
[NASA-CR-170836] N83-32069
LUMINOSITY
Detecting heavy quarks
[DE83-011365] N83-32561
Luminosity of continuous beams with crossing angle
[DE83-003279] N83-32593
LUTETIUM
Electronic structure of hcp lutetium
[DE83-004866] N83-32643

M

MACHINE TOOLS
Computer aided design and production system for sequence controllers of machine tools (MARCS)
[PB83-179135] N83-31910
MAGNESIUM OXIDES
Formation energy of point defects in free surfaces and grain boundaries in MgO
[DE83-008524] N83-32622
MAGNETIC BEARINGS
Linear magnetic bearing
[NASA-CASE-GSC-12517-1] N83-32067
MAGNETIC COILS
Constrained ripple optimization of Tokamak bundle divertors
[DE83-006363] N83-32597
MAGNETIC DISKS
Computer aided design and production system for sequence controllers of machine tools (MARCS)
[PB83-179135] N83-31910
MAGNETIC EQUATOR
Variation of equatorial F-region irregularity parameters as a function of solar activity
[AD-A127895] N83-32209
MAGNETIC FIELDS
Coherence studies of geomagnetic fluctuations in the frequency range .05 to 10 Hz
[AD-A127708] N83-31936
Generation of enhanced-scalelength plasmas and Zeeman study of magnetic fields
[AD-A127951] N83-32596
Constrained ripple optimization of Tokamak bundle divertors
[DE83-006363] N83-32597
Magnetic fusion energy and computers. The role of computing in magnetic fusion energy research and development
[DE83-006565] N83-32599
A quantitative study of magnetic flux transport on the Sun
[AD-A127122] N83-32697
Gamma bursts
[DE83-004810] N83-32704
MAGNETIC FLUX
Linear magnetic bearing
[NASA-CASE-GSC-12517-1] N83-32067
A quantitative study of magnetic flux transport on the Sun
[AD-A127122] N83-32697
MAGNETIC MOMENTS
Polarized-neutron spectrometer development and experiments at Brookhaven
[DE83-000978] N83-32041
MAGNETIC PROPERTIES
Fault-current limiter using a superconducting coil
[DE83-003557] N83-31986
Saturated tearing modes in Tokamaks with divertors
[DE83-005589] N83-32598
Fermi-surface properties of CeSn-3 and related compounds
[DE83-008606] N83-32621
Influence of ion radiation on the magnetic properties of ferrimagnetic films
[BMFT-FB-T-83-048] N83-32644
MAGNETIC STARS
The A-stars: Problems and perspectives. Monograph series on nonthermal phenomena in stellar atmospheres
[NASA-SP-463] N83-32693
MAGNETIZATION
Observation of a first-order phase transition in single-crystal ErRh-4B4 at Hc-2
[DE83-008609] N83-32623
MAGNETOHYDRODYNAMIC STABILITY
Drag instability in the modified betatron
[AD-A128242] N83-32526
MAGNETOHYDRODYNAMIC WAVES
Alfven waves in the solar wind in association with solar energetic particles: Sunspot umbral origin
[AD-A128046] N83-32701
MAGNETOHYDRODYNAMICS
MIE scattering theory for particle sizing interferometry with the dual beam laser velocimeter
[DE83-009249] N83-32063
Noncanonical Hamiltonian formulation of ideal magnetohydrodynamics
[DE83-000649] N83-32603
Adiabatic compression of elongated field-reversed configurations
[DE83-003533] N83-32604
MAGNETOSPHERE
Interaction of solar wind with magnetosphere of Venus N83-31627
Saturn as a radio source
[NASA-TM-85023] N83-32695
MAGNETRONS
Design study for a gound microwave power transmission system for use with a high-altitude powered platform
[NASA-CR-168344] N83-32180
MAGNETS
Linear magnetic bearing
[NASA-CASE-GSC-12517-1] N83-32067
Permanent magnet undulators
[DE83-003590] N83-32511
MAINE
Metal input and mobilization in 2 acid-stressed lake watersheds in Maine
[PB83-182022] N83-32201
MAINTENANCE
Optimization of long range major rehabilitation of airfield pavements
[AD-A127579] N83-31613
Space station needs, attributes and architectural options study review report
[NASA-CR-172947] N83-31714
Polymer concrete patching manual
[PB83-180265] N83-31912
Some generalizations of the renewal process
[AD-A127522] N83-32431
Building and operating the logistics composite model (LCM) for new weapon systems, part A
[AD-A127538] N83-32662
MALES
Metabolic and vascomotor insulative responses occurring on immersion in cold water
[AD-A128021] N83-32296
MAN MACHINE SYSTEMS
Some effects of stress on users of a voice recognition system: A preliminary inquiry
[AD-A128559] N83-31944
A preliminary analysis of human factors affecting the recognition accuracy of a discrete word recognizer for C3 systems
[AD-A128546] N83-31946
Automation in the workplace, its impact on the labor force, and the role of labor market planning for policymaking N83-32312
MANAGEMENT
Study of the causes of unnecessary removals of avionic equipment
[AD-A127546] N83-31570
MANAGEMENT ANALYSIS
Legal and administrative systems for water allocation and management: Options for change. Seven perspectives on aspects of water resource planning in the southeastern states
[PB83-187120] N83-32173
MANAGEMENT INFORMATION SYSTEMS
Option generation techniques for command and control
[AD-A127715] N83-32308
MANAGEMENT METHODS
Aggregates, activities and overheads
[AD-A127830] N83-32477
MANAGEMENT PLANNING
The challenge for metrology in the R&D environment
[DE83-003101] N83-31907
Generating capacity in US electric utilities: How is it used? How much is needed over the decade
[DE83-900733] N83-31990
Legal and administrative systems for water allocation and management: Options for change. Seven perspectives on aspects of water resource planning in the southeastern states
[PB83-187120] N83-32173
Workshop for the Winter Monsoon Experiment
[AD-A127989] N83-32239
Problems associated with the implementation of management control systems
[AD-A127254] N83-32658
Management's role for reducing employee stress
[AD-A127126] N83-32659
Planning and scheduling enhancement in the aquisition process 2tt the Aeronautical Systems Div.
[AD-A128521] N83-32666
MANAGEMENT SYSTEMS
Interactive automated system for normalization of relations
[AD-A127496] N83-32673
MANEUVERABILITY
Combat performance evaluation of fighter aircraft: A suite of FORTRAN-IV programs based on energy manoeuverability theory
[AD-A128263] N83-31599
MANGANESE COMPOUNDS
Study of intergranular embrittlement in Fe-12Mn alloys
[DE83-002623] N83-31835
MANIFOLDS (MATHEMATICS)
Fiber cobordism and approximation of a singular submanifold by C(infinity) N83-32340

MANIPULATORS
Definition of satellite servicing technology development missions for early space stations. Volume 2: Technical [NASA-CR-170844] N83-31634
Dynamic scaling of manipulator trajectories [AD-A127074] N83-32313
Conceptual design report for a fusion engineering device [DE83-002288] N83-32602
MANUALS
Tonopah Test Range capabilities: Technical manual [DE83-005362] N83-31709
MANUFACTURING
Flexible manufacturing system handbook. Volume 4. Appendices [AD-A127930] N83-31902
Nondestructive quality control discussed N83-32651
MAPPING
Wellborne inertial navigation system [DE83-004012] N83-31593
Optical character recognition for automated cartography: The advanced development handprinted symbol recognition system [AD-A127566] N83-32152
Ground-water resources of the White River Basin, Hamilton and Tipton Counties, Indiana [PB83-184309] N83-32169
K-band radiometric mapping of sea ice [AD-A128205] N83-32268
MARAGING STEELS
Development of a cryogenic windtunnel balance [KB-TE-1-1173] N83-31611
MARANGONI CONVECTION
Fluid physics under reduced gravity: An overview --- Spacelab experiments N83-31638
Thermocapillary migration of bubbles in liquids showing relaxation of surface tension N83-31643
On thermally-driven movement of drops in microgravity conditions N83-31645
MARINE METEOROLOGY
Satellite Data Distribution System (SDDS). The development and demonstration of new fisheries support products based on remote ocean sensing from satellites [E83-10399] N83-32147
MARINE TECHNOLOGY
A summary of the foundation research program, FY 1982 [AD-A127995] N83-32663
MARKET RESEARCH
Customer premises services market demand assessment 1980 - 2000. Volume 1: Executive summary [NASA-CR-168150] N83-31925
Customer premises services market demand assessment 1980 - 2000: Volume 2 [NASA-CR-168151] N83-31926
MARKETING
The commercialization of new technologies transfer from laboratory to firm [AD-A128233] N83-32688
MARKOV PROCESSES
Multiple state models with covariates: Analysis and Simulation [AD-A127439] N83-32409
MARTENSITE
Martensite structure after thermal-magnetic and thermal-mechanical-magnetic treatment [BLL-M-34939-(5828.4)] N83-31796
Crystallography of lath martensite and stabilization of retained austenite [DE83-003714] N83-31832
Effect of microstructure on fatigue crack growth in duplex ferrite-martensite steels [DE83-003715] N83-31833
MARTENSITIC STAINLESS STEELS
Suitability of low-carbon, ferritic-martensitic steels for cold heading of fastener components [BLL-M-34972-(5828.4)] N83-31813
MASS SPECTROSCOPY
Characterization of internal sales by laser desorption mass spectrometry [AD-A127916] N83-31746
Time resolved study of primary decomposition process for nitro paraffins and nitramines [AD-A127660] N83-31748
MASS TRANSFER
The influence on the Marangoni effect of a surface tension minimum as a function of temperature in microgravity conditions N83-31669
Periodic crystallization of binary melts under diffusion controlled mass transfer N83-31702
Absorption of ethanol and water vapor by Silicalite, a hydrophobic molecular sieve [DE83-004981] N83-31788
Electrochemical mass transfer to parallel plates with and without turbulence promoters: Simulation of plate heat exchanger configurations [PB83-183145] N83-31794
Low-pressure transfer operations [DE83-003443] N83-32011
Study of heat and mass transfer in a vertical-tube evaporative cooler [DE83-003480] N83-32022
MATERIALS HANDLING
Flexible manufacturing system handbook. Volume 2: Description of the technology [AD-A127928] N83-31900
Acoustic system for material transport [NASA-CASE-NPO-15453-1] N83-32515
Quality assurance program for isotopic power systems [DE83-005250] N83-32560
Post accident procedures for chemicals and propellants [AD-A127505] N83-32661
MATERIALS RECOVERY
Recovery of precious metals from materials containing selenium, tellurium, arsenic and antimony [BMFT-FB-T-83-050] N83-31848
MATERIALS SCIENCE
Materials Sciences Under Microgravity --- conferences [ESA-SP-191] N83-31637
MATHEMATICAL MODELS
A theoretical model for the Speech Input Device SMD3. Part 2: Correlators [NPL-DITC-21/83-PT-2] N83-31922
Blast wave decay from an exploding hemispherical gas cloud [PB83-177857] N83-32025
Comparison of CRD, APU, and state models for Iowa corn and soybeans and North Dakota barley and spring wheat [E83-10379] N83-32132
Remote sensing determination of hydrograph recession characteristics [PB83-186627] N83-32170
A scavenging model for stratified precipitation [DE83-003374] N83-32242
Integrable models of shallow water waves [AD-A127816] N83-32263
An artificial intelligence technique to generate self-optimizing experimental designs [AD-A127764] N83-32402
A singular perturbation approach for the analysis of the fundamental semiconductor equation [AD-A127728] N83-32425
Elements of simulation error analysis [AD-A128497] N83-32450
Simple model order reduction by truncation with performance verification by fast digital simulation [RR-217] N83-32460
Algorithmic methods in probability [AD-A128536] N83-32475
Three-dimensional parabolic-equation-based estimation of the ocean acoustic field [AD-A128507] N83-32520
Extraction and propagation of an intense rotating electron beam [AD-A127018] N83-32523
Search for new heavy techniparticles [DE83-003945] N83-32551
Rheology via nonequilibrium molecular dynamics [DE83-004302] N83-32558
Theoretical studies of point defects and diffusion in Nb3Sn [DE83-005146] N83-32630
User's manual for training device cost model 'TRACOM' [AD-A128355] N83-32664
MATHEMATICAL PROGRAMMING
A condition number for differentiable convex inequalities [AD-A127941] N83-32414
MATRICES (MATHEMATICS)
The software scene in the extraction of Eigenvalues from sparse matrices [AD-A127972] N83-32381
A condition number for differentiable convex inequalities [AD-A127941] N83-32414
Inference on parameters in a linear model, a review of recent results [AD-A127486] N83-32429
New syndrome decoding techniques for convolutional codes over GFq [AD-A127955] N83-32432
Stable viscosity matrices for systems of conservation laws [AD-A127759] N83-32447
Development and application of the discrete ordinates-transfer matrix hybrid method for deterministic streaming calculations [DE82-017387] N83-32457
Noncanonical Hamiltonian formulation of ideal magnetohydrodynamics [DE83-000649] N83-32603
MATRIX METHODS
Maintenance estimation methodology N83-32367
MAXIMUM LIKELIHOOD ESTIMATES
Multiple state models with covariates: Analysis and Simulation [AD-A127439] N83-32409
MAXWELL EQUATION
Three-dimensional computer modeling of electromagnetic fields: A global-lookback lattice-truncation scheme [DE83-006583] N83-31949
MAXWELL-BOLTZMANN DENSITY FUNCTION
Relaxation of velocity distribution of electrons cooled (heated) by rotational excitation (de-excitation) of N sub 2 N83-32494
MEAN
On subset selection procedures for the largest mean from normal populations having a common known coefficient of variation [AD-A127136] N83-32461
MEASURE AND INTEGRATION
From A to Z: Proceedings of a Symposium in Honour of A. C. Zaanen [MATH-CENTRE-TRACTS-149] N83-32316
On the Radon-Nikodym Theorem N83-32322
MEASUREMENT
The challenge for metrology in the R&D environment [DE83-003101] N83-31907
MEASURING INSTRUMENTS
Automated instrumentation system verification [AD-A127775] N83-32030
Characteristics and use of the transient reactivity meter [DE83-003726] N83-32040
Automation of hydrophysical research N83-32125
Detecting heavy quarks [DE83-011365] N83-32561
MECHANICAL DRIVES
Combat maintenance concepts and repair techniques using shape memory alloys for fluid lines, control tubes and drive shafts [AD-A127826] N83-31572
MECHANICAL PROPERTIES
Procedure for testing mechanical properties of high-tensile alloy-steel bolts [BLL-M-26991-(5828.4)] N83-31801
Influence of temperature-deformation conditions on mechanical properties of rolled plate after straightening [BLL-M-26987-(5828.4)] N83-31809
Development of heavy section 3.5% Ni steel plates with good mechanical properties after stress relieving [PB83-178605] N83-31850
High-temperature corrosion of ceramics [DE83-008763] N83-31873
Experimental observations of shear patterns in direct shear tests [PB83-187351] N83-31917
Research on hot cracking in weld metal by melting-solidification heat cycle simulator [PB83-178921] N83-32075
Buckling of steel-containment shells. Task 1B: Buckling of Washington Public Power Supply Systems' plant no. 2 containment vessel [DE83-901036] N83-32118
MELTING
Melt fingers and pool penetration into a miscible substrate --- for application to the design of post-accident core retention systems for nuclear reactors [DE83-004511] N83-31768
Research on hot cracking in weld metal by melting-solidification heat cycle simulator [PB83-178921] N83-32075
MELTS (CRYSTAL GROWTH)
Precipitation of gas pores in metallic metals during cooling under microgravity N83-31648
On the nucleation of melts under microgravity conditions N83-31649
Reactions in glass melt systems --- in microgravity N83-31663
Order of magnitude analysis of solute macrosegregation in crystal growth from the melt N83-31683
Periodic crystallization of binary melts under diffusion controlled mass transfer N83-31702
Rapid solidification studies of Ni3Al alloys [DE83-004648] N83-31838
High-purity germanium crystal growing [DE83-004181] N83-32632

MEMBRANE STRUCTURES
Proline metabolism in plants under environmental stresses
[DE83-002735] N83-32284
MEMORY
Retrograde amnesia, in rats, produced by electron beam exposure
[AD-A126870] N83-32282
Exceptional memory
[AD-A126977] N83-32307
MENTAL PERFORMANCE
Retrograde amnesia, in rats, produced by electron beam exposure
[AD-A126870] N83-32282
Exceptional memory
[AD-A126977] N83-32307
Computational introspection
[AD-A127132] N83-32399
MERCURY COMPOUNDS
The behavior of a metallic dispersion under microgravity conditions N83-31647
Recent developments in thick mercuric iodide spectrometers
[DE83-003007] N83-32037
MESOSCALE PHENOMENA
Mesoscale climatology of cloud cover over Korea and Germany
[AD-A127521] N83-32237
MESOSPHERE
Analysis of NOAA/Alaskan MST radar data
[AD-A127023] N83-31927
MESSAGE PROCESSING
Naval communications processing and routing system (NAVCOMPARS): A model for broadcast performance analysis
[AD-A127990] N83-31940
METABOLISM
Proline metabolism in plants under environmental stresses
[DE83-002735] N83-32284
Metabolic and vasomotor insulative responses occurring on immersion in cold water
[AD-A128021] N83-32296
METAL BONDING
Adhesion of metals experiment simulation and ground-based reference test results N83-31692
Thermal barrier coating system having improved adhesion
[NASA-CASE-LEW-1335901] N83-31855
Chemistry of glass-ceramic/metal bonding for header applications. 1: Effect of treatments on Inconel 718 and Hastelloy C-276 metallic surfaces — on actuators and initiators
[DE83-003367] N83-32068
METAL FATIGUE
Roll-bonded 300M/1010 steel metal-metal laminates: Forgeability, toughness, fatigue, and stress corrosion
[AD-A127541] N83-31826
METAL FOAMS
Precipitation of gas pores in metallic metals during cooling under microgravity N83-31648
METAL HALIDES
Halide and chalcogenide clusters of the early transition metals
[DE83-003792] N83-31841
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible
[AD-A128534] N83-32062
METAL MATRIX COMPOSITES
Metallic composite materials and microgravity N83-31641
The behavior of a metallic dispersion under microgravity conditions N83-31647
Interface character of aluminum-graphite metal matrix composites
[AD-A127590] N83-31736
Production of an aluminium-lead alloy in micro-gravity
[BLL-M-28685-(5828.4)] N83-31807
METAL OXIDE SEMICONDUCTORS
High voltage v-groove solar cell
[NASA-CASE-LEW-13401-2] N83-32177
Fabricate indium-antimonide two-dimensional charge injection device array
[AD-A127638] N83-32618
METAL OXIDES
Metal clusters and extended metal-metal bonding in metal oxide systems
[DE83-003793] N83-31821
METAL PLATES
Development of heavy section 3.5% Ni steel plates with good mechanical properties after stress relieving
[PB83-178665] N83-31850
In-depth survey report of American Airlines plating facility
[PB83-187799] N83-31916
A method for making an alkaline battery electrode plate
[NASA-TM-77249] N83-31956
METAL POLISHING
The development and evaluation of point defect models for the growth of passive films on single crystal, polycrystalline, and amorphous metal surfaces
[AD-A126333] N83-32619
METAL SHELLS
Buckling of steel containment shells. Task 4: Use of the PANDA program for simple buckling analyses of stiffened cylindrical shells
[DE83-900980] N83-32115
METAL SURFACES
High-resolution electron-energy-loss spectroscopy and photoelectron-diffraction studies of the geometric structure of adsorbates on single-crystal metal surfaces
[DE83-003395] N83-31764
Contact-potential and surface-charge effects in atmospheric-electrical instrumentation
[NASA-CR-172834] N83-32027
METAL-METAL BONDING
Metal clusters and extended metal-metal bonding in metal oxide systems
[DE83-003793] N83-31821
Roll-bonded 300M/1010 steel metal-metal laminates: Forgeability, toughness, fatigue, and stress corrosion
[AD-A127541] N83-31826
Halide and chalcogenide clusters of the early transition metals
[DE83-003792] N83-31841
Studies of a molybdenum-molybdenum bonded species. 1: Synthesis and characterization of a reduction product of Cs3Mo2Cl8H. 2: Mixed sulfur/chlorine-substituted hexanuclear and molybdenum clusters
[DE83-04971] N83-31879
Development of narrow gap welding technology for extremely thick steel
[PB83-178913] N83-31909
In-depth survey report of American Airlines plating facility
[PB83-187799] N83-31916
METALS
Strain hardening of heavily cold-worked metals
[DE83-003544] N83-31840
METASTABLE STATE
On fatigue crack growth in a Ti-4, 5Al-5Mo-1.5Cr alloy with metastable beta-phase
[AD-A128048] N83-31825
Mode specificity in unimolecular reaction dynamics
[DE83-0001932] N83-32546
METEOROLOGICAL PARAMETERS
Interpretations of the OSCAR data for reactive-gas scavenging
[DE83-003597] N83-32195
Low level convergence and the prediction of convective precipitation
[AD-A127673] N83-32236
Terminal forecast reference notebook for Ramstein AB, Germany
[AD-A128319] N83-32240
Differential rain and snow scavenging efficiency implied by ionic concentration differences
[DE83-006304] N83-32245
Near-surface meteorological conditions associated with active resuspension of dust by wind erosion
[DE83-006272] N83-32247
Studies in air quality meteorology at North Carolina State University
[PB83-181743] N83-32252
Satellite transmission of ODAS-451 data during July and August 1982
[PB83-183632] N83-32253
ODAS-450 transmission regularity and meteorological data representativity
[PB83-183731] N83-32254
ODAD-451 data buoy in the north-east Atlantic (61 deg 36'N, 13 deg 24'W)
[PB83-183806] N83-32275
Environmental standards for electro-optical systems
[AD-A127776] N83-32588
METEOROLOGICAL SERVICES
The West Coast surge prediction experiment 1981-82
[IOS-150] N83-32273
METEOROLOGY
USSR report: Earth sciences, no. 26
[JPRS-83622] N83-32121
USSR report: Earth sciences, no. 27
[JPRS-83829] N83-32123
Petrosyants interviewed on results of PIGAP program N83-32124
METHANATION
Pacific Northwest Regional Biomass Program
[PB83-188623] N83-31893
METHANE
Investigation of axisymmetric buoyant turbulent diffusion flames: Turbulence properties and concentrations of major species
[PB83-175612] N83-31915
METHYL ALCOHOLS
Preliminary perspective on pure methanol fuel for transportation
[PB83-180232] N83-31892
Ocean energy system at the Johns Hopkins University Applied Physics Laboratory
[PB83-180034] N83-32185
METHYL COMPOUNDS
Unimolecular reactions of nitrites and nitrates
[AD-A127825] N83-32526
METHYLHYDRAZINE
Detecting monomethylhydrazine rocket fuel vapors with the MDA model 3060 autospot automatic toxic gas detector
[AD-A127512] N83-31722
METRIC SPACE
Some lattice properties of the space L2 N83-32327
METROLOGY
The challenge for metrology in the R&D environment
[DE83-003101] N83-31907
Electromagnetic Stirred Mode Cavities (SMCs) — metrology
[NPL-DES-75] N83-31955
Deriving metrics for relating complexity measures to software maintenance costs
[DE83-000672] N83-32390
Suitability of a wall-stabilized arc as a transfer standard of spectral radiance in the spectral range 165 to 350 nm
[NPL-QU-65] N83-32479
Calendar of selected aeronautical and space meetings
[AGARD-CAL-83/1] N83-32706
MICHIGAN
Project demonstration of wind turbine electricity: Interconnecting a northern Michigan fruit farm with a major utility
[DE83-001387] N83-31984
MICROBIOLOGY
Health effects of combustion-generated soot and polycyclic aromatic hydrocarbons: Human cell studies
[DE83-004578] N83-32196
Microbiological control of the aquatic weed Myriophyllum Spp
[PB83-181958] N83-32204
MICROCHANNEL PLATES
Study of the electric field inside microchannel plate multipliers
[DE83-003944] N83-31978
MICROCOMPUTERS
Low cost harmonic analyser for the distribution network
[PB83-184697] N83-31992
Negative phase sequence recorder based on a single chip microcomputer
[PB83-184689] N83-32043
An approach for implementing a microcomputer based report origination system in the Ada programming language
[AD-A128028] N83-32383
MICROELECTRONICS
Cosmic ray effects on microelectronics. Part 2: The geomagnetic cutoff effects
[AD-A128601] N83-32703
MICROHARDNESS
Recommended procedure for micro-indentation Vickers hardness test
[NPL-MOM-62] N83-32094
MICROORGANISMS
Microbiological control of the aquatic weed Myriophyllum Spp
[PB83-181958] N83-32204
MICROPROCESSORS
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 4: Test generation
[AD-A127985] N83-31967
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 1: Executive summary
[AD-A127984] N83-31968
Operating instructions manual for Microprocessor Airborne Data Acquisition and Replay (MADAR) module
[AD-A128558] N83-32031
Mini-MCA: An intelligent inspection instrument
[DE83-001979] N83-32038
Universal microcomputer interface for data acquisition
[AD-A127875] N83-32346
MICROSTRUCTURE
High-resolution electron-energy-loss spectroscopy and photoelectron-diffraction studies of the geometric structure of adsorbates on single-crystal metal surfaces
[DE83-003395] N83-31764

Use of analytical electron microscopy and Auger electron spectroscopy for evaluating materials
[DE83-003658] N83-31784
Motive forces of structural changes in ferrosilicon during heating after slight deformations
[BLL-M-35039-(5828.4)] N83-31799
On fatigue crack growth in a Ti-4, 5Al-5Mo-1.5Cr alloy with metastable beta-phase
[AD-A128048] N83-31825
Some aspects of the plastic deformation of phase mixtures with coarse microstructures
[DE83-001624] N83-31828
Effects of microstructure on light ion irradiation creep in nickel
[DE83-003467] N83-31831
Crystallography of lath martensite and stabilization of retained austenite
[DE83-003714] N83-31832
Effect of microstructure on fatigue crack growth in duplex ferrite-martensite steels
[DE83-003715] N83-31833
Rapid solidification studies of Ni3Al alloys
[DE83-004648] N83-31838
Lath martensites in low carbon steels
[DE83-002622] N83-31839
Review of factors affecting microstructure and toughness in simulated heat-affected zones of structural steels
[PB83-180208] N83-31851
Microstructural characterization of nuclear-waste ceramics
[DE83-000362] N83-31860
Weld-cracking mechanisms in austenitic stainless steels
[DE83-001157] N83-32111
Effects of microstructure on the speed and attenuation of elastic waves
[DE83-000671] N83-32116

MICROWAVE OSCILLATORS
Applications of Josephson junction SQUIDs Superconducting Quantum Interference Device) and Arrays
[AD-A127135] N83-31962

MICROWAVE TRANSMISSION
Design study for a gound microwave power transmission system for use with a high-altitude powered platform
[NASA-CR-168344] N83-32180

MICROWAVES
The thermal basis for disruption of operant behavior by microwaves in three animal species
[AD-A127370] N83-32279
Operant behavior and colonic temperature of rhesus monkeys, Macaca mulatta, exposed to microwaves at frequencies above and near whole-body resonance
[AD-A127326] N83-32280
Bioeffects of radiofrequency radiation: A review pertinent to Air Force operations
[AD-A128515] N83-32293

MIGRATION
Thermal-gradient migration of brine inclusions in salt crystals
[DE83-004180] N83-32633

MILITARY AIR FACILITIES
Terminal forecast reference notebook for Ramstein AB, Germany
[AD-A128319] N83-32240

MILITARY OPERATIONS
Effect of test result uncertainty on the performance of a context-free troubleshooting task
[AD-A128584] N83-31573
Service life evaluation of rigid explosive transfer lines
[NASA-TP-2143] N83-31596
Evaluation of design criterion of the strategic expeditionary landing field
[AD-A128323] N83-31614
Computer Aided System for Developing Aircrew Training (CASDAT)
[AD-A128530] N83-31615
Potential joint civil and military use of military airfields
[PB83-186734] N83-31616
Policy and organization: The next step in the National Space Program
[AD-A127012] N83-31704
An economic analysis of alternative paving materials
[AD-A127534] N83-31903
Bioeffects of radiofrequency radiation: A review pertinent to Air Force operations
[AD-A128515] N83-32293
Problems associated with the implementation of management control systems
[AD-A127254] N83-32658

MILITARY PSYCHOLOGY
Women at sea: Welcome aboard
[AD-A128602] N83-32646

MILLIMETER WAVES
Millimeter microwave emission by use of plasma produced electrons orbiting a positively-charged wire
[AD-A127240] N83-32046

MINERAL EXPLORATION
Space survey techniques benefit geology N83-31630
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E83-10373] N83-32128
Geologic exploration: The contribution of LANDSAT-4 thematic mapper data
[E83-10387] N83-32140
Airborne-temperature-survey maps of heat-flow anomalies for exploration geology
[DE82-019111] N83-32224

MINERAL METABOLISM
Commentaries on successful plant growing experiments on Salyut-7 N83-31628

MINERALOGY
Systematic studies on coals of different deposits, including their mineral matter
[BMFT-FB-T-83-068] N83-32160

MINES (EXCAVATIONS)
Report on solar-neutrino experiments
[DE83-001306] N83-32543

MINICOMPUTERS
Hardware and software implementation of an interface between the Unibus and the General Purpose Interface Bus
[AD-A127564] N83-32377

MINIMAX TECHNIQUE
Some aspects of critical point theory
[AD-A127757] N83-32446

MINNESOTA
Preliminary evaluation of the ground-water-flow system in the Twin Cities metropolitan area, Minnesota
[PB83-174599] N83-32162

MIRROR FUSION
Atomic physics processes in radial transport calculations
[DE83-007172] N83-32535
Fusion-power demonstration
[DE83-010370] N83-32609

MIRRORS
An automatic monoellipsoidal mirror furnace facility for long-term crystal growth on the European Retrievable Carrier (EURECA) N83-31655
Development of an acoustic levitation device with a mirror furnace --- for spaceborne applications N83-31656
Electromagnetic mirror dynamics
[AD-A127515] N83-31938

MISSILE RANGES
The aerodynamics range: A national historic mechanical engineering landmark
[AD-A128042] N83-31706
Flight termination system equipment. Volume 4: Safing and arming devices, initiators, and shaped charges
[AD-A127480] N83-31707
Flight termination system equipment. Volume 3: Relays, timers, and switches
[AD-A127479] N83-31708

MISSILES
Flight termination system equipment. Volume 4: Safing and arming devices, initiators, and shaped charges
[AD-A127480] N83-31707
Flight termination system equipment. Volume 3: Relays, timers, and switches
[AD-A127479] N83-31708

MISSION PLANNING
Polyethylene free balloon design from the perspectives of user and designer
[AD-A127553] N83-31583
Definition of satellite servicing technology development missions for early space stations
[NASA-CR-170843] N83-31635
Space station needs, attributes and architectural options study costing working group briefing
[NASA-CR-172950] N83-31717
Space station needs, attributes and architectural options study mission requirement working group briefing
[NASA-CR-172951] N83-31718

MITOCHONDRIA
Proline metabolism in plants under environmental stresses
[DE83-002735] N83-32284

MITOSIS
Health effects of combustion-generated soot and polycyclic aromatic hydrocarbons: Human cell studies
[DE83-004578] N83-32196

MIXERS
Sounding-rocket flight test of an acoustic mixer by manufacture of a lead-zinc emulsion alloy in microgravity N83-31652

MIXING
Neutrino mixing in grand unified models
[DE83-004342] N83-32552

MIXTURES
Stopping powers and ranges of electrons and positrons
[PB83-175687] N83-32562
Therymodynamic properties of strongly nonideal fluid mixtures from an xtended quasi-chemical theory
[DE83-004295] N83-32645

MNEMONICS
Exceptional memory
[AD-A126977] N83-32307

MODELS
Space station needs, attributes and architectural options study costing working group briefing
[NASA-CR-172950] N83-31717
The role of a mental model in learning to operate a device
[AD-A127281] N83-32305

MODEMS
Modem signature analysis
[AD-A127993] N83-31939

MODES (STANDING WAVES)
Electromagnetic Stirred Mode Cavities (SMCs) --- metrology
[NPL-DES-75] N83-31955

MODULUS OF ELASTICITY
Design technology of advanced composites
[AD-A127892] N83-31735

MOISTURE
Geotechnical instrumentation requirements for at-depth testing and repository monitoring in tuff
[DE83-002188] N83-32034
K-band radiometric mapping of sea ice
[AD-A128205] N83-32268

MOISTURE CONTENT
The water factor in harvest-sprouting of hard red spring wheat
[E83-10376] N83-32129

MOLDING MATERIALS
Diallyl phthalate prepolymer characterization and testing in fiberglass filled molding compounds
[DE83-009352] N83-31874

MOLECULAR BEAM EPITAXY
Doping and transport studies in In/sub x/Ga/sub 1-x/As/GaAs strained-layer superlattices
[DE83-003915] N83-32640

MOLECULAR BEAMS
Time resolved study of primary decomposition process for nitro paraffins and nitramines
[AD-A127660] N83-31748

MOLECULAR COLLISIONS
Classical and semiclassical aspects of chemical dynamics
[DE83-0002024] N83-31766
Energy disposal in electronically excited halogens and oxygen
[AD-A127585] N83-32051
Exact direct-simulation-scheme for the Boltzmann equation/correlation of molecular velocities subject to renewal processes N83-32492

MOLECULAR ENERGY LEVELS
Inclusion of discrete-to-continuum coupling in multiphoton excitation and dissociation calculations
[NASA-CR-172836] N83-32529

MOLECULAR EXCITATION
Inclusion of discrete-to-continuum coupling in multiphoton excitation and dissociation calculations
[NASA-CR-172836] N83-32529

MOLECULAR FLOW
Exact direct-simulation-scheme for the Boltzmann equation/correlation of molecular velocities subject to renewal processes N83-32492
Rheology via nonequilibrium molecular dynamics
[DE83-004302] N83-32558

MOLECULAR GASES
Monte Carlo simulation in molecular gas dynamics N83-32500

MOLECULAR ORBITALS
Development of practical MO techniques for prediction of the properties and behavior of materials
[AD-A127029] N83-32524

MOLECULAR OSCILLATORS
Mode specificity in unimolecular reaction dynamics
[DE83-0001932] N83-32546

MOLECULAR ROTATION
Relaxation of velocity distribution of electrons cooled (heated) by rotational excitation (de-excitation) of N sub 2 N83-32494
Rotational temperature measurements in free jet expansions on N sub 2 using electron beam fluorescence technique N83-32496

MOLECULAR STRUCTURE
Unimolecular reactions of nitrites and nitrates
[AD-A127825] N83-32528

The crystal and molcular structures of selected ruthenium (II) phosphate complexes and vinyl bromide-benzothiophene adducts
[DE83-004788] N83-32635

MOLECULES
Laser-induced fluorescence detection of large organic molecules
[DE83-000353] N83-32540

MOLTEN SALTS
Thermodynamics of irreversible processes in molten salts: Problems of interdiffusion measurements under microgravity N83-31682
Development of molten salt baths for the electrodeposition of gold and gold alloys
[BMFT-FB-T-83-051] N83-31849

MOLYBDENUM
Studies of a molybdenum-molybdenum bonded species. 1: Synthesis and characterization of a reduction product of Cs3Mo2Cl8H. 2: Mixed sulfur/chlorine-substituted hexanuclear and molybdenum clusters
[DE83-04971] N83-31879
X-ray topographic fractography of single crystals of molybdenum and niobium
[DE83-005066] N83-32642

MOLYBDENUM OXIDES
Metal clusters and extended metal-metal bonding in metal oxide systems
[DE83-003793] N83-31821

MONITORS
Timing and control monitor system requirements
[DE83-005343] N83-32246

MONKEYS
Operant behavior and colonic temperature of rhesus monkeys, Macaca mulatta, exposed to microwaves at frequencies above and near whole-body resonance
[AD-A127326] N83-32280

MONOCHROMATIC RADIATION
Monochromatic high-speed photography of solid rocket propellant combustion
[AD-A127874] N83-31747
Ion time-of-flight spectroscopy: Krypton charge-state spectra as a function of photon excitation energy near the K edge
[DE83-002221] N83-32550

MONOMERS
Phosphorus-containing imide resins
[NASA-CASE-ARC-11368-1] N83-31854
Simultaneous determination of molar absorption coefficients and equilibrium constants for monomer-dimer equilibria
[AD-A126599] N83-31871

MONOTECTIC ALLOYS
Ostwald ripening and solidification behavior of near monotectic ZN-PB alloys N83-31646
Implications of the lack of wetting at the monotectic growth front — in space N83-31680

MONSOONS
Workshop for the Winter Monsoon Experiment
[AD-A127989] N83-32239

MONTANA
Effects of snow compaction on water release and sediment yield, Bridger Bowl Ski Area, Gallatin County, Montana
[PB83-186445] N83-32174

MONTE CARLO METHOD
A PACER: A Monte Carlo time-dependent spectrum program for generating few-group diffusion-theory cross sections
[DE83-003779] N83-32351
Two models of time constrainted target travel between two endpoints constructed by the application of Brownian motion and a random tour
[AD-A127805] N83-32448
Eulerian-Lagrangian relationships in Monte Carlo simulations of turbulent diffusion
[DE83-003490] N83-32453
Monte Carlo simulation in molecular gas dynamics N83-32500
Detecting heavy quarks
[DE83-011365] N83-32561
Why QCD lattice theory is important to spin physicists
[DE83-003955] N83-32638
Lattice guage theories
[DE83-002827] N83-32639

MOORING
Satellite transmission of ODAS-451 data during July and August 1982
[PB83-183632] N83-32253
ODAS-450 transmission regularity and meteorological data representativity
[PB83-183731] N83-32254

MORPHOLOGY
Lath martensites in low carbon steels
[DE83-002622] N83-31839
Metabolic and vascomotor insulative responses occurring on immersion in cold water
[AD-A128021] N83-32296

MOTION
Internal motion in high vacuum systems
[DE83-001417] N83-31906

MOTION SICKNESS
Two experiments on laboratory-induced motion sickness. Part 1: Acupressure. Part 2: Repeated exposure
[AD-A127327] N83-32290

MOUNTAINS
Characterization of subsidence over multiple-lift longwall panels
[DE83-001856] N83-32219

MOVING TARGET INDICATORS
Velocity discrimination in the peripheral visual field
[AD-A127949] N83-32297

MTBF
Relationship between manufacturing yields and field failure rates of electronic equipment
[AD-A128498] N83-32078

MULTIBEAM ANTENNAS
Multibeam single frequency synthetic aperture radar processor for imaging separate range swaths
[NASA-CASE-NPO-14525-2] N83-31918

MULTICHANNEL COMMUNICATION
Naval communications processing and routing system (NAVCOMPARS): A model for broadcast performance analysis
[AD-A127990] N83-31940

MULTIPHASE FLOW
Energy release and fluid dynamics in multiphase systems
[AD-A128289] N83-32005

MULTIPHOTON ABSORPTION
Third-harmonic generation for photoionization studies
[DE83-001960] N83-32544

MULTIPLEXING
Ambient and cryogenic temperature testing of a 32-channel CMOS multiplexer
[NASA-TM-84385] N83-31957

MULTIPLIERS
The smallest superharmonic majorant and its relation to the existence of entire functions of the exponential type playing the role of multiplier N83-32333

MULTISPECTRAL BAND SCANNERS
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E83-10373] N83-32128
The equivalence of three techniques for estimating ground reflectance from LANDSAT digital count data
[E83-10378] N83-32131
Impact of LANDSAT MSS sensor differences on change detection analysis
[E83-10395] N83-32145

MULTIVARIATE STATISTICAL ANALYSIS
A statistical approach to zonal polynominals
[AD-A127624] N83-32418
Inference on parameters in a linear model, a review of recent results
[AD-A127486] N83-32429
A class of multivariate new better than used processes
[AD-A127535] N83-32469
Characterizations of multivariate classes of life distributions
[AD-A127783] N83-32471
Computational implementation of the multivariate Halley method for solving nonlinear systems of equations
[AD-A127782] N83-32472

MUSCULAR STRENGTH
Comparison of weight training and calisthentic exercise programs in developing strength and muscular endurance in United States Army recruits
[AD-A128067] N83-32295

MUTATIONS
Health effects of combustion-generated soot and polycyclic aromatic hydrocarbons: Human cell studies
[DE83-004578] N83-32196

N

NASA PROGRAMS
Structures and Dynamics Division: Research and technology plans for FY 1983 and accomplishments for FY 1982
[NASA-TM-85661] N83-32095
NASA publications guide
[NASA-SP-7047] N83-32671

NATURAL GAS
Decision models for conducting an economic analysis of alternative fuels for the ice engine
[AD-A127954] N83-31887

NATURAL GAS EXPLORATION
Drilling at accesses to Earth's mantle N83-32122

NATURAL LANGUAGE (COMPUTERS)
A post-processing algorithm for time domain pitch trackers
[AD-A127671] N83-31934
An expert distributed robotics system with comprehension and learning abilities in the aircraft flight domain
[AD-A127739] N83-32401

NAVIER-STOKES EQUATION
Discretization and solution techniques for Navier-Stokes and transonic flow problems
[AD-A127944] N83-32002
Tests of subgrid-scale models in strained turbulence. Studies of the structure of homogeneous shear flows: Developing a model of turbulence near a wall from solutions of the Navier-Stokes equation
[AD-A128282] N83-32004
Statistical mechanics of non-equilibrium processes in plasmas and gases
[AD-A128339] N83-32006
Mixed finite element methods with applications to flow and other problems
[AD-A127751] N83-32008
An iterative method for solving finite difference approximations to Stokes equations
[AD-A127704] N83-32415
Frequency effect of transonic flow over an oscillating airfoil N83-32486

NAVY
Problems associated with the implementation of management control systems
[AD-A127254] N83-32658
A summary of the foundation research program, FY 1982
[AD-A127995] N83-32663

NEGATIVE IONS
Research on a new type of negative hydrogen ion source
[AD-A127947] N83-32525
High-brightness negative-hydrogen linear accelerator
[DE83-003565] N83-32545

NETS
Characterization of subsidence over multiple-lift longwall panels
[DE83-001856] N83-32219

NETWORK ANALYSIS
Seismographic networks: Problems and outlook for the 1980's
[AD-A128032] N83-32215

NEUTRAL BEAMS
Oak Ridge beam-analysis system
[DE83002587] N83-32035
Diagnostics for neutral-beam-heated Tokamaks
[DE83-005049] N83-32605

NEUTRAL PARTICLES
Development and application of the discrete ordinates-transfer matrix hybrid method for deterministic streaming calculations
[DE82-017387] N83-32457

NEUTRINOS
Neutrino mixing in grand unified models
[DE83-004342] N83-32552

NEUTRON ACTIVATION ANALYSIS
Physical basis for prompt-neutron activation analysis
[DE83-003938] N83-32559

NEUTRON DECAY
Oscillating neutrons and disappearing baryons: A theoretical overview
[DE83-004929] N83-32553

NEUTRON IRRADIATION
Effects of irradiation on ceramics for fusion-reactor applications
[DE83-009468] N83-31872

NEUTRON PHYSICS
Oscillating neutrons and disappearing baryons: A theoretical overview
[DE83-004929] N83-32553

NEUTRON SCATTERING
Polarized-neutron spectrometer development and experiments at Brookhaven
[DE83-000978] N83-32041

NEUTRON SPECTROMETERS
Polarized-neutron spectrometer development and experiments at Brookhaven
[DE83-000978] N83-32041

NEUTRON STARS
Thermonuclear model for high energy transients — X-ray and gamma ray bursts
[DE83-002814] N83-32566

NEUTRONS
Oscillating neutrons and disappearing baryons: A theoretical overview
[DE83-004929] N83-32553

NEW HAMPSHIRE
Distribution of tidal bottom stress in a New Hampshire estuary
[PB83-184085] N83-32276
NEWS
Electronics Engineering Department Computer Program Newsletter no. 8: Image-Processing Computer Codes
[DE83-007768] N83-32392
NICKEL
Infrared spectra of CO adsorbed at low temperatures on Ni
[DE83-001568] N83-31765
The aging of Co-20 percent Ni - 6.5 percent Nb alloy
[BLL-M-34951-(5828.4)] N83-31811
Thermodynamic functions of carbon solution in liquid nickel and cobalt
[BLL-M-34981-(5828.4)] N83-31816
Effects of microstructure on light ion irradiation creep in nickel
[DE83-003467] N83-31831
Heat treating effects on environmental hydrogen embrittlement of nickel
[DE83-004921] N83-31844
NICKEL ALLOYS
Rapid solidification studies of Ni3Al alloys
[DE83-004648] N83-31838
Development of ferritic weldments for grain-refined ferritic steels for 4.2K service
[DE83-009059] N83-32072
Corrosion resistant canisters for nuclear waste isolation
[DE83-000090] N83-32564
The development and evaluation of point defect models for the growth of passive films on single crystal, polycrystalline, and amorphous metal surfaces
[AD-A128333] N83-32619
NICKEL COMPOUNDS
Electro-chemical synthesis of organo-metallic nickel compounds
[BLL-OA-TRANS-3018-(6196.3)] N83-31797
Study of the anomalous behavior of the electrical resistivity in alloys near the PrNi5.0 composition
[DE83-004787] N83-31847
NICKEL STEELS
Development of heavy section 3.5% Ni steel plates with good mechanical properties after stress relieving
[PB83-178665] N83-31850
NIOBATES
Surface acoustic wave non-linear interactions in lithium niobate
[AD-A127570] N83-32052
NIOBIUM
X-ray diffraction analysis of Nb-3Ge and NbGe alloys
[NASA-CR-170831] N83-31744
The aging of Co-20 percent Ni - 6.5 percent Nb alloy
[BLL-M-34951-(5828.4)] N83-31811
Fast-neutron total and scattering cross sections of niobium
[DE83-002285] N83-32537
X-ray topographic fractography of single crystals of molybdenum and niobium
[DE83-005066] N83-32642
NIOBIUM STANNIDES
Theoretical studies of point defects and diffusion in Nb3Sn
[DE83-005146] N83-32630
NITRATES
Interpretations of the OSCAR data for reactive-gas scavenging
[DE83-003597] N83-32195
NITRIC ACID
Extractive distillation of nitric acid using the two-pot concept
[DE83-004176] N83-31777
NITRIDES
Densification kinetics of shock-activated nitrides
[DE83-003008] N83-31742
NITROGEN
Relaxation of velocity distribution of electrons cooled (heated) by rotational excitation (de-excitation) of N sub 2 N83-32494
Rotational temperature measurements in free jet expansions on N sub 2 using electron beam fluorescence technique N83-32496
NITROGEN COMPOUNDS
Activity of hydrogen in metal-hydrogen systems: Strontium, thorium-nitrogen and vandaium alloys
[DE83-004976] N83-31843
NITROGEN LASERS
Use of nitrogen laser for observation of space-charge effects in drift chambers
[DE83-004416] N83-32065
NITROGEN OXIDES
Catalyst for exhaust-gas purification
[DE83-005019] N83-31770
NO-x emissions from pulverized-coal arch-fired boilers
[DE83-901472] N83-32193
NITROMETHANE
Time resolved study of primary decomposition process for nitro paraffins and nitramines
[AD-A127660] N83-31748
NOAA 6 SATELLITE
Simulation of meteorological satellite (METSAT) data using LANDSAT data
[E83-10381] N83-32134
NOBLE METALS
Recovery of precious metals from materials containing selenium, tellurium, arsenic and antimony
[BMFT-FB-T-83-050] N83-31848
NODES (STANDING WAVES)
System for controlled acoustic rotation of objects
[NASA-CASE-NPO-15522-1] N83-32516
NOISE (SOUND)
Noise thermometry measurements in combustion processes
[AD-A127945] N83-31758
NOISE INTENSITY
Ambient and cryogenic temperature testing of a 32-channel CMOS multiplexer
[NASA-TM-84385] N83-31957
NOISE MEASUREMENT
Use of acoustic emissions to predict ground stability
[PB83-178764] N83-31911
ELF PVS field strength measurements, October 1977
[AD-A128196] N83-31930
The effect on the measurement of aircraft noise of reflections from the ground
[NPL-AC-102] N83-32517
Interior noise and vibration measurements on operational military helicopters and comparisons with various ride quality criteria
[NASA-TM-84664] N83-32518
NOISE REDUCTION
Interior noise and vibration measurements on operational military helicopters and comparisons with various ride quality criteria
[NASA-TM-84664] N83-32518
Iterative noise elimination preliminary report
[AD-A127756] N83-32519
Fundamental limits on SQUID technology
[DE83-002561] N83-32629
NONDESTRUCTIVE TESTS
Nondestructive stress measurements in aluminum
[AD-A127699] N83-31823
Experience with non-destructive testing of rolled product quality at the Orsk Khalilovo Works
[BLL-M-34974-(5828.4)] N83-32076
Nondestructive inspection and measurement
[AD-A127971] N83-32077
Scattering by flaws in a slab or a half-space
[DE83-000637] N83-32080
Nondestructive quality control discussed N83-32651
NONEQUILIBRIUM FLOW
Analysis of steady, 2-dimensional chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique. Volume 1: Theoretical development
[AD-A127219] N83-31997
Rheology via nonequilibrium molecular dynamics
[DE83-004302] N83-32558
NONEQUILIBRIUM THERMODYNAMICS
Thermodynamics of irreversible processes in molten salts: Problems of interdiffusion measurements under microgravity N83-31662
Electrolyte solutions near the critical point of water: A review and proposal for studies under microgravity conditions N83-31698
NONLINEAR EQUATIONS
Experimental and analytical study of natural-convection heat transfer of internally heated liquids
[DE83-005384] N83-32013
NATO/London Mathematical Society Advanced Study Institute on systems of Nonlinear Partial Differential Equations
[AD-A126996] N83-32406
A nonlinear integral equation occuring in a singular free boundary problem
[AD-A127940] N83-32413
A boundary value problem for quasilinear degenerate parabolic equations
[AD-A127729] N83-32424
Computational implementation of the multivariate Halley method for solving nonlinear systems of equations
[AD-A127782] N83-32472
NONLINEAR PROGRAMMING
The entropic penalty approach to stochastic programming
[AD-A127920] N83-32462
NONLINEAR SYSTEMS
Fault diagnosis of nonlinear analog circuits. Volume 4: An isolation algorithm for the analog fault dictionary
[AD-A127020] N83-31959
Fault diagnosis of nonlinear analog circuits. Volume 3: Fault diagnosis in the tableau context
[AD-A127019] N83-31960
Non-linear data fitting for analysis of friction stress and recovery in metal alloys
[NPL-DITC-13/82] N83-32003
Impulse response of the ocean floor nonlinear techniques for measurement enhancement
[AD-A128578] N83-32269
Real-time implementation of nonlinear optical processing functions
[AD-A127024] N83-32579
NONLINEARITY
Investigation of limit cycle response of aerodynamic surfaces with structural nonlinearities
[AD-A127140] N83-31580
Self-study manual on optical radiation measurements. Part 3, Applications, chapter 1, Measurement of solar terrestrial spectral irradiance in the ozone cut-off region
[PB83-184382] N83-32231
NONUNIFORM FLOW
The trajectory of a heated, buoyant jet in a non-uniform cross-flow
[BAE-KAD-GEN-N-2868] N83-31994
NORMAL DENSITY FUNCTIONS
Simulation of Brownian motion affected by Gaussian force in gravitational field N83-32503
NORMALITY
Quasiresonance of long life
[AD-A127763] N83-32442
On confidence intervals for cyclic regenerative processes
[AD-A127761] N83-32444
A decomposition of the Beta distribution, related order and asymptotic behavior
[AD-A127815] N83-32474
NORTH CAROLINA
Studies in air quality meteorology at North Carolina State University
[PB83-181743] N83-32252
NORTH DAKOTA
Comparison of CRD, APU, and state models for Iowa corn and soybeans and North Dakota barley and spring wheat
[E83-10379] N83-32132
NORWAY
Space research in Norway
[SAD-102-T] N83-32689
NOTCHES
Reconstituted Charpy impact specimens
[DE83-901113] N83-32113
NOZZLE FLOW
Calculation of, and research into, the particulars of the current of guniting material flowing through a lance nozzle
[BLL-M-34993-(5828.4)] N83-31728
X-ray measurements of water-fog density
[DE83-005139] N83-32243
Research on a new type of negative hydrogen ion source
[AD-A127947] N83-32525
NOZZLE GEOMETRY
X-ray measurements of water-fog density
[DE83-005139] N83-32243
NUCLEAR FUEL REPROCESSING
Extractive distillation of nitric acid using the two-pot concept
[DE83-004176] N83-31777
NUCLEAR FUELS
Heat transfer to water from a vertical tube bundle under natural-circulation conditions
[DE83-008459] N83-32010
NUCLEAR FUSION
Status of DOE's implementation of the magnetic fusion energy engineering act of 1980
[GAO/RCED-83-105] N83-32594
Magnetic fusion energy and computers. The role of computing in magnetic fusion energy research and development
[DE83-006565] N83-32599
Continuous Tokamak operation with an internal transformer
[DE83-002340] N83-32600
Conceptual design report for a fusion engineering device
[DE83-002288] N83-32602
Burn dynamic experiment based on the field-reversed theta pinch
[DE83-005071] N83-32607
Fusion-power demonstration
[DE83-010370] N83-32609

Department of Energy Civilian Research and Development Authorization Act for fiscal year 1984
[H-REPT-98-81] N83-32683
NUCLEAR MAGNETIC RESONANCE
Bis(bipyrazine)ruthenium(II) complexes: Characterization, spectroscopy and electrochemistry
[AD-A127500] N83-31751
The NMR (Nuclear Magnetic Resonance) sensor for calibrating the field of a superconducting solenoid
[AD-A127997] N83-31973
NUCLEAR MODELS
Thermonuclear model for high energy transients — X-ray and gamma ray bursts
[DE83-002814] N83-32566
NUCLEAR PARTICLES
Influence of ion radiation on the magnetic properties of ferrimagnetic films
[BMFT-FB-T-83-048] N83-32644
NUCLEAR PHYSICS
Versatile secondary trigger for a multi-detector system
[DE83-04414] N83-31982
New accelerators in high-energy physics
[DE83-002817] N83-32570
Current analysis for rotating and vibrating heavy nuclei
[DE83-000612] N83-32637
NUCLEAR POWER PLANTS
Safety engineering: KTA code of practice. Lifting mechanisms in nuclear plant
[BLL-CE-TRANS-7880-(9022.09)] N83-31898
Automated on-line L-edge measurement of SNM concentration for near-real-time accounting
[DE83-000666] N83-32039
Simplified methods for the inelastic analysis and reliability assessment of stiffened shells — for nuclear power plant containment vessels
[DE83-004966] N83-32100
Regional tectonics and seismicity of southwestern Iowa
[DE83-900978] N83-32226
NUCLEAR RADIATION
Response of a multi-element dosimeter to calibrated beta sources with E sub max from 0.23 to 3.5 MeV
[DE83-002013] N83-32532
NUCLEAR REACTORS
The CRT display evaluation: The multidimensional rating of CRT-generated displays
[DE83-003699] N83-31979
Heat transfer to water from a vertical tube bundle under natural-circulation conditions
[DE83-008459] N83-32010
X-ray measurements of water-fog density
[DE83-005139] N83-32243
Preliminary investigation of interconnected systems interactions for the safety injection system of Indian Point-3
[DE83-009172] N83-32451
Fusion-power demonstration
[DE83-010370] N83-32609
NUCLEAR RESEARCH
Research needs of the new accelerator technologies
[DE83-000518] N83-32541
NUCLEAR SPIN
Electronically induced phase transformations
[AD-A127031] N83-31745
NUCLEAR STRUCTURE
Development of data-acquisition-and-analysis systems for in-beam gamma-ray spectroscopy: A study of the nucleus 180W
[DE83-004992] N83-31781
NUCLEATION
On the nucleation of melts under microgravity conditions N83-31649
NUCLEI (NUCLEAR PHYSICS)
A light-scattering system to measure cavitation nuclei: Analysis and calibration
[AD-A127946] N83-32589
NUMERICAL ANALYSIS
Manufacturing in space: Fluid dynamics numerical analysis
[NASA-CR-172944] N83-31996
Convective heat transfer in buildings: Recent research results
[DE83-015706] N83-32017
Simple theory for maximum H inventory and release: A new transport parameter
[DE82-014076] N83-32641
NUMERICAL FLOW VISUALIZATION
Flow field visualization of vapor condensation in the enclosure N83-32504
NYQUIST DIAGRAM
Robustness with simultaneous pole and zero movement across the j-omega axis
[OUEL-1465/83] N83-32404

O

OCCULTATION
IR and visible wavelength obscuration by pyrotechnically generated alkali-halide smokes
[AD-A127616] N83-32581
OCEAN BOTTOM
Ocean floor geomagnetic data collection system
[AD-A127618] N83-32260
Oceanic Pn/Sn phases: A qualitative explanation and reinterpretation of the T-phase
[AD-A128343] N83-32266
Global analysis of the shallow geology of large-scale ocean slopes
[AD-A128208] N83-32267
Impulse response of the ocean floor nonlinear techniques for measurement enhancement
[AD-A128578] N83-32269
Distribution of tidal bottom stress in a New Hampshire estuary
[PB83-184085] N83-32276
OCEAN CURRENTS
An evaluation of SARP (search and rescue planning system) drift predictions using satellite-tracked drift-buoys
[AD-A127987] N83-31588
On computing instantaneous geocentric tides along satellite tracks, the NSWC STT program
[AD-A128568] N83-32264
Interaction of waves and currents
[AD-A128551] N83-32265
OCEAN DATA ACQUISITIONS SYSTEMS
Automation of hydrophysical research N83-32125
OCEAN DYNAMICS
Findings and recommendations on various marine, atmospheric, and coastal zone issues
[PB83-186213] N83-32120
OCEAN MODELS
Estimation of wave spectra from wave height and period
[IOS-135] N83-32271
The West Coast surge prediction experiment 1981-82
[IOS-150] N83-32273
OCEAN TEMPERATURE
Satellite Data Distribution System (SDDS). The development and demonstration of new fisheries support products based on remote ocean sensing from satellites
[E83-10399] N83-32147
OCEAN THERMAL ENERGY CONVERSION
Ocean energy system at the Johns Hopkins University Applied Physics Laboratory
[PB83-180034] N83-32185
OCEANOGRAPHY
USSR report: Earth sciences, no. 26
[JPRS-83622] N83-32121
USSR report: Earth sciences, no. 27
[JPRS-83829] N83-32123
Automation of hydrophysical research N83-32125
Bibliography of technical reports, 1982
[PB83-191064] N83-32274
Systems overview of the subseabed disposal program
[DE83-000091] N83-32569
OCEANS
Information on ocean disposal of municipal and industrial waste
[GAO/RCED-83-161] N83-32190
On computing instantaneous geocentric tides along satellite tracks, the NSWC STT program
[AD-A128568] N83-32264
OIL EXPLORATION
Geologic exploration: The contribution of LANDSAT-4 thematic mapper data
[E83-10387] N83-32140
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration
[E83-10389] N83-32142
OIL RECOVERY
Evaluation of the North Stanley Polymer Demonstration Project
[DE83-006915] N83-31876
ON-LINE SYSTEMS
The GOES user's guide N83-31710
ONE DIMENSIONAL FLOW
Oxyhydrogen ignition and flame propagation under cryogenic temperatures N83-32484
OPERATING SYSTEMS (COMPUTERS)
The TOPSY guide. Transient tunnel operating, data acquisition and processing system. User's and programmer's guides
[OUEL-1462/83] N83-31610
Hardware and software implementation of an interface between the Unibus and the General Purpose Interface Bus
[AD-A127564] N83-32377
OPERATIONS RESEARCH
Aggregates, activities and overheads
[AD-A127830] N83-32477
Algorithms and heuristics for variable-yield lot-sizing
[AD-A127559] N83-32478
OPERATORS (MATHEMATICS)
From A to Z: Proceedings of a Symposium in Honour of A. C. Zaanen
[MATH-CENTRE-TRACTS-149] N83-32316
Symmetrisable operators and minimal factorization N83-32320
Some recent results on positive groups and semi-groups N83-32324
Integral operators N83-32325
Compact operators N83-32328
OPTICAL BISTABILITY
Transverse and quantum effects in superfluorescence: Pump dynamics for three-level superfluorescence; An algorithm for transverse, full transient effects in optical bistability in a Fabry-Perot cavity
[AD-A127502] N83-32584
OPTICAL COMMUNICATION
Electronic technology (selected articles)
[AD-A127809] N83-31970
OPTICAL DATA PROCESSING
Multibeam single frequency synthetic aperture radar processor for imaging separate range swaths
[NASA-CASE-NPO-14525-2] N83-31918
Real-time implementation of nonlinear optical processing functions
[AD-A127024] N83-32579
OPTICAL EQUIPMENT
A study of computer-aided geometric optical design
[AD-A127438] N83-32345
OPTICAL MEASUREMENT
Interferometric angle monitor
[NASA-CASE-GSC-12614-1] N83-32577
OPTICAL MEASURING INSTRUMENTS
Preliminary design of an Earth-based debris detection system using current technology and existing installations
[NASA-CR-171680] N83-31705
Three laser scanning instruments for automatic surface inspection N83-32578
OPTICAL PROPERTIES
Holographic methods for the investigation of photophysical properties
[AD-A128510] N83-32032
The problems of protection against optical radiation
[BR88714] N83-32287
Cold weather goggles. Part 5: Acceptable limits of optical distortion
[AD-A127657] N83-32315
Transverse and quantum effects in superfluorescence: Pump dynamics for three-level superfluorescence; An algorithm for transverse, full transient effects in optical bistability in a Fabry-Perot cavity
[AD-A127502] N83-32584
Fundamental models of electronic transport in amorphous semiconductors
[DE83-000313] N83-32626
OPTICAL PUMPING
A modification to a flashlamp-pumped dye laser to increase stability of the spatial mode
[AD-A128037] N83-32057
OPTICAL RADAR
Coherent laser radar remote sensing
[AD-A127717] N83-32053
Proposal for a new Thomson scattering technique for large fusion devices
[IPF-82-16] N83-32611
OPTICAL SCANNERS
Optical character recognition for automated cartography: The advanced development handprinted symbol recognition system
[AD-A127566] N83-32152
OPTICAL TRACKING
Tonopah Test Range capabilities: Technical manual
[DE83-005362] N83-31709
OPTIMAL CONTROL
A new algorithm for the solution of optimal control commutative bilinear system
[RR-212] N83-32393
The algebraic Riccati equation: A summary review of some available results — optimal control problems
[NPL-DITC-23/83] N83-32405
OPTIMIZATION
Optimum design of stiffened plates using the finite element method
[AD-A128556] N83-32110
Force method optimization II. Volume 2: User's manual
[AD-A128235] N83-32387
Failure detection with uncertain models
[NASA-CR-172835] N83-32417

Optimum multisensor, multitarget time delay estimation [AD-A127639] N83-32423
Algorithms and heuristics for variable-yield lot-sizing [AD-A127559] N83-32478
Constrained ripple optimization of Tokamak bundle divertors [DE83-006363] N83-32597

ORBIT PERTURBATION
Commentary on Astron satellite N83-31624

ORBITAL ASSEMBLY
Definition of satellite servicing technology development missions for early space stations. Volume 2: Technical [NASA-CR-170844] N83-31634
Beam connector apparatus and assembly [NASA-CASE-MFS-25134-1] N83-31895

ORBITAL MECHANICS
Rendezvous in space N83-31629

ORBITAL POSITION ESTIMATION
Rendezvous in space N83-31629

ORBITAL RENDEZVOUS
Commentary on Soyuz T-8 rendezvous failure N83-31619
Rendezvous in space N83-31629

ORBITAL SERVICING
Definition of satellite servicing technology development missions for early space stations [NASA-CR-170843] N83-31635

ORGANIZATIONS
R&D acitivities of Belorussian SSR Academy of Sciences described N83-32654
Organizational structure considerations for software development projects [AD-A127061] N83-32660

ORGANOMETALLIC COMPOUNDS
Gordon Research Conference in Organometer Chemistry [AD-A127055] N83-31725
Electro-chemical synthesis of organo-metallic nickel compounds [BLL-OA-TRANS-3018-(6196.3)] N83-31797

ORGANOMETALLIC POLYMERS
Advances in the SEC (Size Exclusion Chromatography) characterization of organometallic copolymers and copolymerization: Desorption of charged species by injected dilute acetic acid [PB83-178681] N83-31789

ORIFICES
Transmission of an explosion through an orifice N83-32024

ORTHOGONALITY
Two orthogonal (v/2)x2v F-rectangle for all even v [AD-A127948] N83-32433

OSCILLATING FLOW
Free-surface vibration of a floating zone induced by surface tension driven oscillating flow N83-31670
Influence of geometry on oscillatory Marangoni flows N83-31672
Oscillatory convection in a spherical cavity due to g-jitter N83-31694

OSCILLATIONS
Perturbation analysis of the limit cycle of the free van der Pol equation [NASA-CR-172166] N83-32341

OSCILLATORS
Research progress and forecast report for MSNW FEL oscillator program [AD-A127786] N83-32061

OUTER SPACE TREATY
Jurist comments on legal questions regarding US shuttle N83-31631

OVERPRESSURE
Hydrogen combustion in aqueous foams [DE83-002534] N83-31775

OXALATES
Bis(bipyrazine)ruthenium(II) complexes: Characterization, spectroscopy and electrochemistry [AD-A127500] N83-31751

OXIDATION
Electrocatalysis on ion-implanted electrodes [DE82-015768] N83-31787
Early stages of sulfidation of iron and iron-chromium alloy in hydrogen sulfide [DE83-004969] N83-31837

OXIDATION-REDUCTION REACTIONS
Semiconductor electrodes. Part 51: Efficient electroluminescence at ZnS electrode in aqueous electrolytes [AD-A127454] N83-31966
Identification and cleavage of breakable single bonds by selecting oxidation, reduction and hydrolysis [DE83-005312] N83-32624

OXIDES
Analysis of oxide and oxide/matrix interfaces in silicon nitride [PB83-178699] N83-31883
Bending moments in oxides on the surface of particles of dispersed iron [BLL-M-34936-(5828.4)] N83-32085

OXYGEN
Calculation of phase equilibrium of Si-O-C system in polynomial form: Communication 1 [BLL-M-34980-(5828.4)] N83-31817
Hydrogen and oxygen from water. Part 6: Quenching the effluent from a solar furnace [AD-A127457] N83-32182

OXYGEN ATOMS
Energy disposal in electronically excited halogens and oxygen [AD-A127585] N83-32051

OXYGEN CONSUMPTION
Thermoregulatory responses to upper body exercise [AD-A127884] N83-32298

OZONE
High efficiency ozone absorption in organically polluted water (downflow column) [BMFT-FB-T-83-056] N83-32199
Self-study manual on optical radiation measurements. Part 3. Applications, chapter 1. Measurement of solar terrestrial spectral irradiance in the ozone cut-off region [PB83-184382] N83-32231

P

P-I-N JUNCTIONS
High voltage v-groove solar cell [NASA-CASE-LEW-13401-2] N83-32177

P-N-P-N JUNCTIONS
High-purity germanium crystal growing [DE83-004181] N83-32632

PACIFIC ISLANDS
Natural landmarks survey of the islands of the Pacific [PB83-182501] N83-32161

PACIFIC NORTHWEST (US)
Pacific Northwest Regional Biomass Program [PB83-188623] N83-31893

PACIFIC OCEAN
Satellite Data Distribution System (SDDS). The development and demonstration of new fisheries support products based on remote ocean sensing from satellites [E83-10399] N83-32147

PACKET TRANSMISSION
A time slot assignment algorithm for a TDMA packet radio network [AD-A128545] N83-31947

PACKETS (COMMUNICATION)
A collision resolution protocol with limited channel sensing: Finitely many users [AD-A128501] N83-31948

PAINTS
Polyurethane paint (PUP) Chemical Agent Resistant Coating (CARC) for Army aircraft [AD-A128006] N83-31868

PAIR PRODUCTION
Testing quantum chromodynamics [DE83-004391] N83-32555

PALEONTOLOGY
Review and evaluation of paleohydrologic methodologies [DE83-004572] N83-32159

PANEL METHOD (FLUID DYNAMICS)
Generation of orthogonal, boby-fitted grids using potential flow solution by the panel method N83-32485

PARABOLIC DIFFERENTIAL EQUATIONS
A boundary value problem for quasilinear degenerate parabolic equations [AD-A127729] N83-32424
Quasilinear elliptic-parabolic differential equations [PREPRINT-568] N83-32458

PARACHUTES
Materials investigation of STS-3 parachute failure [NASA-TM-82540] N83-31712

PARALLEL PLATES
Electrochemical mass transfer to parallel plates with and without turbulence promoters: Simulation of plate heat exchanger configurations [PB83-183145] N83-31794

PARALLEL PROCESSING (COMPUTERS)
A deductive approach to the debugging, verification and modification of programs [AD-A127900] N83-32373
Distributing a database for parallelism [AD-A127856] N83-32374
Real-time implementation of nonlinear optical processing functions [AD-A127024] N83-32579

PARTIAL DIFFERENTIAL EQUATIONS
Characteristic Cauchy problems and solutions of formal power series N83-32335
NATO/London Mathematical Society Advanced Study Institute on systems of Nonlinear Partial Differential Equations [AD-A126996] N83-32406
Existence of viscosity solutions of Hamilton-Jacobi equations [AD-A127691] N83-32421
Differential games and representation formulas for solutions of Hamilton-Jacobi-Isaacs equations [AD-A127758] N83-32445
Self-semilar solutions of hydrodynamic equations for expanding layer with boundary condition specified by differential equation N83-32481

PARTICLE ACCELERATION
Four pi physics with the plastic ball [DE83-004190] N83-32556

PARTICLE ACCELERATOR TARGETS
Testing quantum chromodynamics [DE83-004391] N83-32555

PARTICLE ACCELERATORS
Large scale superfluid practice [DE83-001563] N83-32513
Research needs of the new accelerator technologies [DE83-000518] N83-32541
Collective effect accelerators and the challenge of attaining ultra-high energies [DE83-002566] N83-32542
New accelerators in high-energy physics [DE83-002817] N83-32570

PARTICLE COLLISIONS
Research studies on radiative collisional processes [AD-A128533] N83-32509
Production of high-transverse-energy events in p-nucleus collisions at 400 GeV/c [DE83-002099] N83-32547

PARTICLE DENSITY (CONCENTRATION)
Propagation of light ion beam micro- and macrostabilities of rotating ion layer N83-32483

PARTICLE INTERACTIONS
Monte Carlo simulation in molecular gas dynamics N83-32500
Collective effect accelerators and the challenge of attaining ultra-high energies [DE83-002566] N83-32542

PARTICLE MOTION
Thermocapillary migration of bubbles in liquids showing relaxation of surface tension N83-31643

PARTICLE PRODUCTION
Charge correlations in deep inelastic proton-proton interactions at the CERN ISR: The axial field spectrometer collaboration [DE83-002324] N83-32539
Measurement of strange quark suppression in hadronic vacuum [DE83-000918] N83-32548

PARTICLE SIZE DISTRIBUTION
Spectrometer sensitivity investigations on the spectrometric oil analysis program [AD-A127969] N83-31752
Fossil fuel gasification technical evaluation services [PB83-195107] N83-31894
Experimental observations of shear patterns in direct shear tests [PB83-187351] N83-31917
Holographic investigation of solid propellant combustion particulates [AD-A127841] N83-32029
MIE scattering theory for particle sizing interferometry with the dual beam laser velocimeter [DE83-009249] N83-32063

PARTICLE TRACKS
Versatile secondary trigger for a multi-detector system [DE83-04414] N83-31982
Psi prime photoproduction at a mean energy of 150 GeV [DE83-000686] N83-32549
Influence of ion radiation on the magnetic properties of ferrimagnetic films [BMFT-FB-T-83-048] N83-32644

PARTICLE TRAJECTORIES
Particle transport induced by directional solidification --- STS 7 N83-31642

PARTICLES
Flow of gas-particle mixtures [AD-A127466] N83-32001

PASCAL (PROGRAMMING LANGUAGE)
Adaptation of computer program for Pourbaix diagrams to personal computers [AD-A128259] N83-32385

PASSENGERS
A computer simulation of aircraft evacuation with fire [NASA-CR-166511] N83-31586

PATHOGENESIS
Microbiological control of the aquatic weed Myriophyllum Spp [PB83-181958] N83-32204

PATTERN RECOGNITION
Geologic exploration: The contribution of LANDSAT-4 thematic mapper data
[E83-10387] N83-32140
Optical character recognition for automated cartography: The advanced development handprinted symbol recognition system
[AD-A127566] N83-32152
PATTERN REGISTRATION
Investigation of several aspects of LANDSAT-4 data quality
[E83-10390] N83-32143
Impact of LANDSAT MSS sensor differences on change detection analysis
[E83-10395] N83-32145
PAVEMENTS
Optimization of long range major rehabilitation of airfield pavements
[AD-A127579] N83-31613
An economic analysis of alternative paving materials
[AD-A127534] N83-31903
PAYLOADS
Space station needs, attributes and architectural options study costing working group briefing
[NASA-CR-172950] N83-31717
PELLETS
Generation of enhanced-scalelength plasmas and Zeeman study of magnetic fields
[AD-A127951] N83-32596
PERCEPTION
Option generation techniques for command and control
[AD-A127715] N83-32308
Methodological contributions of person perception to performance appraisal
[AD-A128638] N83-32311
Enhancing perceptibility of barely perceptible targets
[AD-A127569] N83-32582
PERCOLATION
Biological intrusion barriers for large-volume waste-disposal sites
[DE83-002061] N83-32571
PERFORMANCE PREDICTION
Private pilot flight skill retention 8, 16 and 24 months following certification
[DOT/FAA/CT-83/34] N83-32303
PERFORMANCE TESTS
Development of an acoustic levitation device with a mirror furnace --- for spaceborne applications N83-31656
Automated instrumentation system verification
[AD-A127775] N83-32030
Integration analysis: A proposed integration of test and evaluation techniques for early on detection of human factors engineering discrepancies
[AD-A127611] N83-32314
PERIODICALS
Air Force Academy Aeronautics Digest, Spring/Summer 1982
[AD-A128248] N83-31571
PERMEABILITY
Geology and engineering characteristics of selected low-permeability gas sands: A survey
[PB83-195099] N83-32230
Simple theory for maximum H inventory and release: A new transport parameter
[DE82-014076] N83-32641
PERSONNEL
Women at sea: Welcome aboard
[AD-A128602] N83-32646
PERSONNEL MANAGEMENT
Methodological contributions of person perception to performance appraisal
[AD-A128638] N83-32311
Management's role for reducing employee stress
[AD-A127126] N83-32659
Organizational structure considerations for software development projects
[AD-A127061] N83-32660
Multiprogram Laboratory Panel Energy Research Advisory Board. Volume 2: Support studies
[DE83-002694] N83-32668
PERTURBATION
Perturbation analysis of the limit cycle of the free van der Pol equation
[NASA-CR-172166] N83-32341
On collocation schemes for quasilinear singularity perturbed boundary value problems
[AD-A127727] N83-32426
PERTURBATION THEORY
Singular perturbation approach to flame theory with chain and competing reactions
[DE83-000642] N83-31772
A singular perturbation approach for the analysis of the fundamental semiconductor equation
[AD-A127728] N83-32425
Inclusion of discrete-to-continuum coupling in multiphoton excitation and dissociation calculations
[NASA-CR-172836] N83-32529
Testing quantum chromodynamics
[DE83-004391] N83-32555
PETROLOGY
Systematic studies on coals of different deposits, including their mineral matter
[BMFT-FB-T-83-068] N83-32160
PH
Analysis of geothermal wastes for hazardous components
[PB83-188680] N83-32203
PH FACTOR
Metal input and mobilization in 2 acid-stressed lake watersheds in Maine
[PB83-182022] N83-32201
PHASE CONTROL
System for controlled acoustic rotation of objects
[NASA-CASE-NPO-15522-1] N83-32516
PHASE TRANSFORMATIONS
Critical point phenomena in fluids N83-31695
Electronically induced phase transformations
[AD-A127031] N83-31745
Melt fingers and pool penetration into a miscible substrate --- for application to the design of post-accident core retention systems for nuclear reactors
[DE83-004511] N83-31768
Computer-simulation studies of grain boundary systems and molecular solids
[AD-A127545] N83-32382
Mathematical representation of size and electronic factors
[DE83-004182] N83-32455
Flow field visualization of vapor condensation in the enclosure N83-32504
High-resolution X-ray scattering
[DE83-004599] N83-32592
Structure and phase transitions of liquid crystals
[AD-A127573] N83-32617
Observation of a first-order phase transition in single-crystal ErRh-4B4 at Hc-2
[DE83-008609] N83-32623
PHASED ARRAYS
Design study for a gound microwave power transmission system for use with a high-altitude powered platform
[NASA-CR-168344] N83-32180
PHENOLS
Anaerobic treatment of gasified effluents
[DE83-001864] N83-31786
Method for the preparation of polymers
[DE83-004941] N83-31880
PHENOMENOLOGY
Critical point phenomena in fluids N83-31695
PHILOSOPHY
The importance of practice in the development of statistics
[AD-A127705] N83-32470
PHONEMES
Controlled test procedures for using intervocalic consonauts to assess speech intelligibility: A feasibility study
[AD-A127953] N83-31941
PHOSPHATES
The crystal and molcular structures of selected ruthenium (II) phosphate complexes and vinyl bromide-benzothiophene adducts
[DE83-004788] N83-32635
PHOSPHINES
Phosphorus-containing imide resins
[NASA-CASE-ARC-11368-1] N83-31854
PHOSPHORS
Beta and low-energy photon irradiation of several commercial phosphors
[DE83-006606] N83-32531
PHOSPHORYLATION
Development of phosphorylated adhesives
[NASA-CR-166507] N83-31724
PHOTOCHEMICAL REACTIONS
Holographic methods for the investigation of photophysical properties
[AD-A128510] N83-32032
Solar-simulator-pumped atomic iodine laser kinetics
[NASA-TP-2182] N83-32044
The crystal and molcular structures of selected ruthenium (II) phosphate complexes and vinyl bromide-benzothiophene adducts
[DE83-004788] N83-32635
PHOTODISSOCIATION
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible
[AD-A128534] N83-32062
Unimolecular reactions of nitrites and nitrates
[AD-A127825] N83-32528
PHOTOELECTRIC EMISSION
Studies of a molybdenum-molybdenum bonded species. 1: Synthesis and characterization of a reduction product of Cs3Mo2Cl8H. 2: Mixed sulfur/chlorine-substituted hexanuclear and molybdenum clusters
[DE83-04971] N83-31879
Picosecond X-ray generation from picosecond photoelectron pulses
[AD-A128031] N83-32586
PHOTOGEOLOGY
A preliminary evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies
[E83-10383] N83-32136
Application of MSS/LANDSAT images to the structural study of recent sedimentary areas: Campos Sedimentary Basin, Rio de Janeiro, Brazil
[E83-10385] N83-32138
Geologic exploration: The contribution of LANDSAT-4 thematic mapper data
[E83-10387] N83-32140
PHOTOGRAPHY
Monochromatic high-speed photography of solid rocket propellant combustion
[AD-A127874] N83-31747
PHOTOINTERPRETATION
Preliminary statistical studies concerning the Campos RJ sugar cane area, using LANDSAT imagery and aerial photographs
[E83-10384] N83-32137
PHOTOIONIZATION
Third-harmonic generation for photoionization studies
[DE83-001960] N83-32544
Ion time-of-flight spectroscopy: Krypton charge-state spectra as a function of photon excitation energy near the K edge
[DE83-002221] N83-32550
PHOTOMETRY
Rocketborne measurements of optical emissions from the auroral E-layer
[AD-A127517] N83-32213
PHOTON BEAMS
Electron and photon stimulated desorption: Benefits and pitfalls
[AD-A128239] N83-32527
PHOTONS
Nonthermal ultrasoft X-ray spectra on ZT-40M
[DE83-007123] N83-32534
Gamma bursts
[DE83-004810] N83-32704
PHOTOPRODUCTION
Psi prime photoproduction at a mean energy of 150 GeV
[DE83-000686] N83-32549
PHOTOSPHERE
Joint solar dynamics project data summary. Volume 1: Chromospheric and coronal observations
[PB83-175638] N83-32702
PHOTOVOLTAIC CELLS
Cloud cover sensor
[NASA-CASE-NPO-14936-1] N83-32232
PHTHALATES
Diallyl phthalate prepolymer characterization and testing in fiberglass filled molding compounds
[DE83-009352] N83-31874
Method for the preparation of polymers
[DE83-004941] N83-31880
PHTHALOCYANIN
Polymer films on electrodes. Part 13: Incorporation of catalysts into electronically conductive polymers: Iron phthalocyanine in polypyrrole
[AD-A127700] N83-31863
PHYSICAL EXERCISE
Comparison of weight training and calisthentic exercise programs in developing strength and muscular endurance in United States Army recruits
[AD-A128067] N83-32295
Thermoregulatory responses to upper body exercise
[AD-A127884] N83-32298
PHYSICAL PROPERTIES
System for monitoring physical characteristics of fluids
[NASA-CASE-NPO-15400-1] N83-31993
PHYSIOLOGICAL EFFECTS
Bioeffects of radiofrequency radiation: A review pertinent to Air Force operations
[AD-A128515] N83-32293
Hypohydration and acclimation: Effects on hormone responses to exercise/heat stress
[AD-A127855] N83-32299
PHYSIOLOGICAL RESPONSES
Evoked potential studies of the effects of impact acceleration on the motor nervous system
[AD-A127562] N83-32278
Thermoregulatory responses to upper body exercise
[AD-A127884] N83-32298

Risk estimates for CO exposure in man based on behavioral and physiological responses in rodents
[NASA-CR-166513] N83-32302
A small sample evaluation of a Bayesian design method for quantal response model
[AD-A127942] N83-32464

PIEZOELECTRIC CRYSTALS
Dynamic applications of piezoelectric crystals. Part 2: Theoretical studies N83-32084
Dynamic applications of piezoelectric crystals. Part 1: Fundamentals N83-32091
Digital synthesis of response-design spectrum compatible earthquake records for dynamic analyses N83-32092

PIEZOELECTRICITY
The effect of plasticizer on the piezoelectric properties of unoriented polyvinylidene fluoride films
[AD-A127863] N83-31861

PILOT PERFORMANCE
Private pilot flight skill retention 8, 16 and 24 months following certification
[DOT/FAA/CT-83/34] N83-32303
Preliminary evaluation of two dichotic listening tasks as predictors of performance in naval aviation undergraduate pilot training
[AD-A127337] N83-32304

PILOT SELECTION
Preliminary evaluation of two dichotic listening tasks as predictors of performance in naval aviation undergraduate pilot training
[AD-A127337] N83-32304

PILOT TRAINING
Preliminary evaluation of two dichotic listening tasks as predictors of performance in naval aviation undergraduate pilot training
[AD-A127337] N83-32304

PINCH EFFECT
ZAPP: Z-pinch atomic physics program
[DE83-005390] N83-32606

PINHOLE CAMERAS
Dual 7 pinhole tomography
[DE83-004589] N83-32591

PIPE FLOW
Heat transfer rate of looped type heat pipes using water and Nak as working fluid under liquid phase flow N83-32508

PIPELINES
Prediction of pressure drop of two-phase coal slurries in pipelines
[DE83-003382] N83-32016

PIPELINING (COMPUTERS)
A two-level pipelined systolic array for multi-dimensional convolution
[AD-A127544] N83-32434

PIPES (TUBES)
Combat maintenance concepts and repair techniques using shape memory alloys for fluid lines, control tubes and drive shafts
[AD-A127826] N83-31572
Fabrication of slender struts for deployable antennas
[NASA-CR-172164] N83-31733
Hydrogen combustion results from the Sandia intermediate-scale (VGES) tank and the Sandia critical-tube-diameter test facility
[DE83-018744] N83-31761
Analysis of field-performance data on shell-and-tube heat exchangers in geothermal service
[DE83-001564] N83-32014
Heat transfer rate of looped type heat pipes using water and Nak as working fluid under liquid phase flow N83-32508

PISTON ENGINES
Vibration analysis of piston engines with application to noise control N83-32083

PITUITARY HORMONES
Circadian growth hormone and prolactin blood concentration during a self-limited viral infection and artificial hyperthermia in man
[AD-A127501] N83-32289

PLANETARY MAGNETIC FIELDS
Interaction of solar wind with magnetosphere of Venus N83-31627
Outer satellite atmospheres: Their nature and planetary interactions
[NASA-CR-172945] N83-32696

PLANETARY WAVES
Further studies in the application of dynamic initialization for global prediction models with special attention to equatorial waves
[AD-A128511] N83-32241

PLANTS (BOTANY)
Ryumin interviewed on Salyut experiments N83-31621
Commentaries on successful plant growing experiments on Salyut-7 N83-31628
Hydrocarbons from plants and trees
[DE83-002228] N83-31727
Peculiarities in formation of Arabidopsis Thaliana (L.) Heynh, generative organs under space flight conditions
[NASA-TM-77263] N83-32277
Proline metabolism in plants under environmental stresses
[DE83-002735] N83-32284

PLASMA COMPRESSION
ZAPP: Z-pinch atomic physics program
[DE83-005390] N83-32606

PLASMA CONTROL
Atomic physics processes in radial transport calculations
[DE83-007172] N83-32535
Continuous Tokamak operation with an internal transformer
[DE83-002340] N83-32600

PLASMA CURRENTS
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia N83-32482

PLASMA DIAGNOSTICS
Laser-plasma interaction experiments and diagnostics at NRL (Naval Research Laboratory)
[AD-A128254] N83-32060
Plasma-edge studies in ISX-B and EBT-S using surface probes and laser-induced fluorescence
[DE83-821045] N83-32601
Diagnostics for neutral-beam-heated Tokamaks
[DE83-005049] N83-32605
Recent advances in Thomson scattering: High repetition rate Thomson scattering diagnostics on large plasma devices
[IPF-82-15] N83-32610
Proposal for a new Thomson scattering technique for large fusion devices
[IPF-82-16] N83-32611

PLASMA DYNAMICS
Adiabatic compression of elongated field-reversed configurations
[DE83-003533] N83-32604

PLASMA ETCHING
Plasma-edge studies in ISX-B and EBT-S using surface probes and laser-induced fluorescence
[DE83-821045] N83-32601

PLASMA GENERATORS
Generation of enhanced-scalelength plasmas and Zeeman study of magnetic fields
[AD-A127951] N83-32596

PLASMA HEATING
Oak Ridge beam-analysis system
[DE83002587] N83-32035
Diagnostics for neutral-beam-heated Tokamaks
[DE83-005049] N83-32605
Burn dynamic experiment based on the field-reversed theta pinch
[DE83-005071] N83-32607

PLASMA INTERACTIONS
Plasma-edge studies in ISX-B and EBT-S using surface probes and laser-induced fluorescence
[DE83-821045] N83-32601

PLASMA OSCILLATIONS
Oscillating neutrons and disappearing baryons: A theoretical overview
[DE83-004929] N83-32553

PLASMA TURBULENCE
Diagnostics for neutral-beam-heated Tokamaks
[DE83-005049] N83-32605

PLASMAS (PHYSICS)
Development of a plasma carburizing process
[PB83-186692] N83-31913
Statistical mechanics of non-equilibrium processes in plasmas and gases
[AD-A128339] N83-32006
Charge correlations in deep inelastic proton-proton interactions at the CERN ISR: The axial field spectrometer collaboration
[DE83-002324] N83-32539
The Antares facility for inertial-fusion experiments: Status and plans
[DE83-003536] N83-32608

PLASTIC COATINGS
Polyurethane paint (PUP) Chemical Agent Resistant Coating (CARC) for Army aircraft
[AD-A128006] N83-31868

PLASTIC DEFORMATION
Some aspects of the plastic deformation of phase mixtures with coarse microstructures
[DE83-001624] N83-31828
Development of narrow gap welding technology for extremely thick steel
[PB83-178913] N83-31909
Rate and magnitude of deformation during cutting of plate materials
[BLL-M-34983-(5828.4)] N83-32088
Stress analysis for anisotropic hardening in finite-deformation plasticity
[AD-A127063] N83-32098
An analysis of conical indentation of an elastic/perfectly plastic half-space by nonlinear finite element techniques
[AD-A127529] N83-32104
An improved strain hardening characterization in the ADINA code using the mechanical sublayer model
[AD-A128287] N83-32108

PLASTIC FLOW
Rheology via nonequilibrium molecular dynamics
[DE83-004302] N83-32558

PLASTIC PROPERTIES
Application of a third-invariant plasticity theory to concrete and soils
[AD-A127079] N83-32097
Stress analysis for anisotropic hardening in finite-deformation plasticity
[AD-A127063] N83-32098
High-temperature elastic-plastic and creep properties for SA533 Grade B Class I and SA508 materials
[DE83-901103] N83-32114
Tension cutoff and parameter identification for the viscoplastic cap model
[AD-A128304] N83-32217

PLASTICIZERS
The effect of plasticizer on the piezoelectric properties of unoriented polyvinylidene fluoride films
[AD-A127863] N83-31861

PLASTICS
Ferromagnetic porous plastics
[DE83-008679] N83-31875
Structural plastics design manual. Volume 2: Phases 2 and 3, chapters 5 - 10
[PB83-185595] N83-31885

PLATES (STRUCTURAL MEMBERS)
Rate and magnitude of deformation during cutting of plate materials
[BLL-M-34983-(5828.4)] N83-32088
Optimum design of stiffened plates using the finite element method
[AD-A128556] N83-32110

PLATES (TECTONICS)
Regional tectonics and seismicity of southwestern Iowa
[DE83-900978] N83-32226
Intraplate seismicity and seismic risk in the Atlantic Ocean based on teleseismically observed earthquakes
[IOS-136] N83-32227

PLOTTERS
Computer aided design and production system for sequence controllers of machine tools (MARCS)
[PB83-179135] N83-31910

PLOTTING
Regional weather depiction plot
[PB83-194415] N83-32258
Basic utility graphics software for the Hewlett-Packard 9845B desktop computer
[PB83-175760] N83-32394

PLUMES
Use of Eulerian initial conditions in a Lagrangian model of turbulent diffusion
[DE83-003479] N83-32454

POINT DEFECTS
The development and evaluation of point defect models for the growth of passive films on single crystal, polycrystalline, and amorphous metal surfaces
[AD-A128333] N83-32619
Formation energy of point defects in free surfaces and grain boundaries in MgO
[DE83-008524] N83-32622
Theoretical studies of point defects and diffusion in Nb3Sn
[DE83-005146] N83-32630

POISSON DENSITY FUNCTIONS
Evaluation of the total time in system in a preempt/resume priority queue via a modified Lindley process
[AD-A127814] N83-32403

POLARIZATION (CHARGE SEPARATION)
Use of nitrogen laser for observation of space-charge effects in drift chambers
[DE83-004416] N83-32065
Gamma bursts
[DE83-004810] N83-32704

POLARIZATION (WAVES)
Polarized-neutron spectrometer development and experiments at Brookhaven
[DE83-000978] N83-32041

POLARONS
Fundamental models of electronic transport in amorphous semiconductors
[DE83-000313] N83-32626

POLICIES
The challenge for metrology in the R&D environment
[DE83-003101] N83-31907

Roles of industry and the university in computer research and development
[PB83-192039] N83-32670

POLLUTION CONTROL
Preliminary perspective on pure methanol fuel for transportation
[PB83-180232] N83-31892
Critical considerations in the assessment of health and environmental risks: What we have learned from the nuclear experience
[DE83-005292] N83-32194
Viral control of nuisance blue-green algae. Part 2: Cyanophage strains, stability studies of phages and hosts, and effects of environmental factors on phage-host interactions
[PB83-178129] N83-32200

POLLUTION MONITORING
Biochemical analyses for detection and assessment of pollution in the subsurface environment
[PB83-182303] N83-31793

POLLUTION TRANSPORT
Review of ground-water flow and transport models in the unsaturated zone
[DE83-004256] N83-32158
A scavenging model for stratified precipitation
[DE83-003374] N83-32242
Relevance of biotic pathways to the long-term regulation of nuclear-waste disposal. Topical Report on reference western arid low-level sites
[DE83-002575] N83-32576

POLYBUTADIENE
Fracture toughness of polybutadiene at cryogenic temperatures
[AD-A126999] N83-31858

POLYCRYSTALS
Magnetic susceptibility of scandium-hydrogen and lutetium-hydrogen solid-solution alloys from 2 to 300 deg K
[DE83-004786] N83-31846

POLYETHYLENES
Electrical-breakdown characteristics and testing of high-voltage XLPE- and EPR-insulated cables
[DE83-000721] N83-31989

POLYGONS
Self-reflecting skew polygons and polytopes in the 4-dimensional hypercube
[AD-A127762] N83-32443

POLYMER CHEMISTRY
CAD/CAM handbook for polymer composite reliability, volume 1
[AD-A127720] N83-31865
Evaluation of the North Stanley Polymer Demonstration Project
[DE83-006915] N83-31876
Polymer intermediates from limonene
[BMFT-FB-T-83-053] N83-31882

POLYMERIC FILMS
Polymer films on electrodes. Part 13: Incorporation of catalysts into electronically conductive polymers: Iron phthalocyanine in polypyrrole
[AD-A127700] N83-31863

POLYMERIZATION
Synthesis, characterization and polymerization of fluorocarbon ether elastomers
[NASA-CR-166487] N83-31723
Diallyl phthalate prepolymer characterization and testing in fiberglass filled molding compounds
[DE83-009352] N83-31874
Method for the preparation of polymers
[DE83-004941] N83-31880
Polymer concrete patching manual
[PB83-180265] N83-31912
Thin films from ammonia-borane
[DE83-003567] N83-32628

POLYMERS
Synthesis of hydroxy-terminated dinitropropyl acrylate polymers and improved characterization of hydroxy-terminated prepolymers
[AD-A127469] N83-31866
Brownian-dynamics computer simulations of one dimensional polymer model. 1: Simple potentials
[DE83-002468] N83-31877
Electrical-breakdown characteristics and testing of high-voltage XLPE- and EPR-insulated cables
[DE83-000721] N83-31989
Wall layer structure and drag reduction: Bursting rates
[AD-A128004] N83-32003

POLYNOMIALS
Calculation of phase equilibrium of Si-O-C system in polynomial form: Communication 1
[BLL-M-34980-(5828.4)] N83-31817
Invariants of a maximal unipotent subgroup of a semi-simple group N83-32330
A statistical approach to zonal polynominals
[AD-A127624] N83-32418
On polynomial approximation in the uniform norm by the discrete least squares method
[AD-A127693] N83-32420

POLYSTYRENE
Diallyl phthalate prepolymer characterization and testing in fiberglass filled molding compounds
[DE83-009352] N83-31874

POLYURETHANE RESINS
Polyethylene free balloon design from the perspectives of user and designer
[AD-A127553] N83-31583
Polyurethane paint (PUP) Chemical Agent Resistant Coating (CARC) for Army aircraft
[AD-A128006] N83-31868

POPULATION THEORY
On subset selection procedures for the largest mean from normal populations having a common known coefficient of variation
[AD-A127136] N83-32461

POPULATIONS
Global trends in population and resources
[GPO-96-841] N83-32149

PORCELAIN
Development of interim performance criteria for restoration coatings for porcelain enamel surfaces
[PB83-185553] N83-31884

POROSITY
Precipitation of gas pores in metallic metals during cooling under microgravity N83-31648

POROUS MATERIALS
Ferromagnetic porous plastics
[DE83-008679] N83-31875
Advanced inorganic separators for alkaline batteries and method of making the same
[NASA-CASE-LEW-13171-2] N83-32176

PORTABLE EQUIPMENT
Mini-MCA: An intelligent inspection instrument
[DE83-001979] N83-32038
A general purpose residual stress analyzer
[AD-A127820] N83-32109

POSITION (LOCATION)
High energy electromagnetic shower position measurement by a fine grained scintillation hodoscope
[DE83-000082] N83-31951
Development of a leak location system for use on underground electric power transmission cable
[DE83-900533] N83-31983
General-purpose stepping motor-encoder positioning subsystem with standard asychronous serial-line interface
[DE83-004634] N83-31987
Localization of surface excitations and stimulated desorption
[DE83-002143] N83-32625

POSITIONING
Internal motion in high vacuum systems
[DE83-001417] N83-31906

POSITRONS
High energy electromagnetic shower position measurement by a fine grained scintillation hodoscope
[DE83-000082] N83-31951
Stopping powers and ranges of electrons and positrons
[PB83-175687] N83-32562
Design considerations for a high-spatial-resolution positron camera with dense-drift-space MWPC's
[DE83-003051] N83-32590
Data processing in neutron protein crystallography using positron-sensitive detectors
[DE83-005803] N83-32636

POSTFLIGHT ANALYSIS
Space Transportation System Mission STS-7
[NASA-TM-85337] N83-31711

POTASSIUM OXIDES
Potassium 4-hydroxyamino-5,7-dinitro-4,5-dihydrobenzofurazanide 3-oxide, the first in a series of new primary explosives
[AD-A128557] N83-31888

POWDER METALLURGY
Characteristics of heat-treatment of R6M5 high-speed powdered steel containing titanium carbide
[BLL-M-34959-(5828.4)] N83-31808
Advanced aluminum-lithium base alloys produced by rapid solidification from the melt
[AD-A127571] N83-31822

POWER AMPLIFIERS
A 500-watt solid-state RF power amplifier AM-7209( )/VRC
[AD-A127462] N83-31965
DSCS 2 LLTWTA helix current anomaly
[AD-A128008] N83-31972

POWER CONDITIONING
Flight-systems safety program
[DE83-001916] N83-32575

POWER GAIN
DSCS 2 LLTWTA helix current anomaly
[AD-A128008] N83-31972

POWER PLANTS
Buckling of steel-containment shells. Task 1B: Buckling of Washington Public Power Supply Systems' plant no. 2 containment vessel
[DE83-901036] N83-32118

POWER SERIES
Characteristic Cauchy problems and solutions of formal power series N83-32335
Perturbation analysis of the limit cycle of the free van der Pol equation
[NASA-CR-172166] N83-32341
Cylindrical Bessel functions for a large range of complex arguments
[AD-A128049] N83-32428

POWER SPECTRA
Optimum multisensor, multitarget time delay estimation
[AD-A127639] N83-32423

POWER TRANSMISSION
Design study for a gound microwave power transmission system for use with a high-altitude powered platform
[NASA-CR-168344] N83-32180

PRASEODYMIUM
Study of the anomalous behavior of the electrical resistivity in alloys near the PrNi5.0 composition
[DE83-004787] N83-31847

PRECIPITATION (CHEMISTRY)
Study of intergranular embrittlement in Fe-12Mn alloys
[DE83-002623] N83-31835
Recovery of precious metals from materials containing selenium, tellurium, arsenic and antimony
[BMFT-FB-T-83-050] N83-31848
Interpretations of the OSCAR data for reactive-gas scavenging
[DE83-003597] N83-32195

PRECIPITATION (METEOROLOGY)
A scavenging model for stratified precipitation
[DE83-003374] N83-32242
Differential rain and snow scavenging efficiency implied by ionic concentration differences
[DE83-006304] N83-32245
Near-surface meteorological conditions associated with active resuspension of dust by wind erosion
[DE83-006272] N83-32247
Cloud physics studies in SCPP (Sierra Cooperative Pilot Project) during 1977-82 and in Utah/1978
[PB83-161307] N83-32248
Variability of precipitation in the Pacific Northwest: Spatial and temporal characteristics
[PB83-175232] N83-32249
Great Lakes precipitation by months, 1900-80
[PB83-175737] N83-32250

PRECISION
Improving divider calibration techniques
[DE83-004061] N83-31988
Velocity discrimination in the peripheral visual field
[AD-A127949] N83-32297

PREDICTION ANALYSIS TECHNIQUES
An evaluation of SARP (search and rescue planning system) drift predictions using satellite-tracked drift-buoys
[AD-A127987] N83-31588
Heat transfer induced performance characteristics of gradient type furnaces --- spaceborne experiment N83-31654
Use of acoustic emissions to predict ground stability
[PB83-178764] N83-31911
Application of the ESCIMO theory to turbulent diffusion flames --- Engulfment, Stretching, Inter-diffusion and Moving Observer (ESCIMO)
[CFD/82/7] N83-32023
The Shock and Vibration Digest, volume 15, no. 4
[AD-A128158] N83-32082
Simplified analysis of shells with local, impulsive loads
[DE83-003791] N83-32119
Remote sensing determination of hydrograph recession characteristics
[PB83-186627] N83-32170
Predicting the acceleration of northward-moving tropical cyclones using upper-tropospheric winds
[AD-A127446] N83-32235
The elevation and duration of wave crests
[AD-A127872] N83-32259
When and how to use a software reliability model N83-32359
Forcing regression through a given point using any familiar computational routine
[AD-A127868] N83-32416
Bayesian models for response surfaces of uncertain functional form
[AD-A127703] N83-32465

PREDICTIONS
Convection coefficients at building surfaces
[DE83-002572] N83-32015

Prediction of pressure drop of two-phase coal slurries in pipelines
[DE83-003382] N83-32016
Study of heat and mass transfer in a vertical-tube evaporative cooler
[DE83-003480] N83-32022
Tropical cyclone wind probability forecasting for the north Indian Ocean (WINDPIO)
[AD-A127130] N83-32233
Comparison of baroclinic eddy heat transport parameterizations to a simplified general circulation model
[PB83-187849] N83-32257

PREPROCESSING
A hardware preprocessor for use in speech recognition: Speech Input Device SID3
[NPL-DITC-22/83] N83-31923

PRESSURE
Two experiments on laboratory-induced motion sickness. Part 1: Acupressure. Part 2: Repeated exposure
[AD-A127327] N83-32290

PRESSURE DEPENDENCE
Effect of pressure on the resistivity and Hall coefficient of amorphous metallic alloys
[DE83-005399] N83-32631

PRESSURE DISTRIBUTION
New considerations on scale extrapolation of wing pressure distributions affected by transonic shock-induced separations
[NASA-CR-166426] N83-31597
Pressure distributions obtained on a 0.04-scale and 0.02-scale model of the Space Shuttle Orbiter's forward fuselage in the Langley 20-inch Mach 6 air tunnel
[NASA-TM-84629] N83-31636
Numerical simulation of turbulent flame and pressure development in gas explosions
[PB83-177832] N83-31790
Diffusion of hydrogen and deuterium in Zr-Al
[DE83-002214] N83-31829
Frequency effect of transonic flow over an oscillating airfoil N83-32486

PRESSURE DROP
Prediction of pressure drop of two-phase coal slurries in pipelines
[DE83-003382] N83-32016

PRESSURE EFFECTS
Calculation of, and research into, the particulars of the current of guniting material flowing through a lance nozzle
[BLL-M-34993-(5828.4)] N83-31728
Influence of chamber length and equivalence ratio on flame propagation in a constant-volume duct
[DE83-002573] N83-31771
Couette flow in continuum to free molecular regime N83-32493

PRESSURE GRADIENTS
Distribution of tidal bottom stress in a New Hampshire estuary
[PB83-184085] N83-32276

PRESSURE MEASUREMENT
Experimental determination of inter-lap pressure in coils of steel strip
[BLL-M-35006-(5828.4)] N83-32087

PRESSURE OSCILLATIONS
Large-scale experiments on turbulent flame and pressure development
[PB83-177840] N83-31791

PRESSURE REGULATORS
Vibration isolation and pressure compensation apparatus for sensitive instrumentation
[NASA-CASE-LAR-12728-1] N83-32026

PRESSURE VESSELS
Applications of energy-release-rate techniques to part-through cracks in experimental pressure vessels
[DE83-003486] N83-32112
High-temperature elastic-plastic and creep properties for SA533 Grade B Class I and SA508 materials
[DE83-901103] N83-32114

PRINTED CIRCUITS
Relationship between manufacturing yields and field failure rates of electronic equipment
[AD-A128498] N83-32078

PROBABILITY DISTRIBUTION FUNCTIONS
Evaluation of the total time in system in a preempt/resume priority quene via a modified Lindley process
[AD-A127814] N83-32403
Significance points for some tests of uniformity on the sphere, revision
[AD-A128027] N83-32435

PROBABILITY THEORY
Variability of precipitation in the Pacific Northwest: Spatial and temporal characteristics
[PB83-175232] N83-32249
Algorithmic methods in probability
[AD-A128536] N83-32475

PROBLEM SOLVING
Discretization and solution techniques for Navier-Stokes and transonic flow problems
[AD-A127944] N83-32002
Option generation techniques for command and control
[AD-A127715] N83-32308
Characteristic Cauchy problems and solutions of formal power series N83-32335
Solution of systems of complex linear equations in the L infinity norm with constraints on the unknowns
[AD-A127883] N83-32410
A nonlinear integral equation occuring in a singular free boundary problem
[AD-A127940] N83-32413
A singular perturbation approach for the analysis of the fundamental semiconductor equation
[AD-A127728] N83-32425
On collocation schemes for quasilinear singularity perturbed boundary value problems
[AD-A127727] N83-32426

PROCEDURES
Recommended procedure for micro-indentation Vickers hardness test
[NPL-MOM-62] N83-32094

PROCESS CONTROL (INDUSTRY)
Advanced pressurized fluidized-bed combustion
[DE83-007641] N83-31760
Robust sampled regulators for stable systems from plant step data
[RR-213] N83-32459

PROCUREMENT MANAGEMENT
Integration analysis: A proposed integration of test and evaluation techniques for early on detection of human factors engineering discrepancies
[AD-A127611] N83-32314
Quality assurance program for isotopic power systems
[DE83-005250] N83-32560
Building and operating the logistics composite model (LCM) for new weapon systems, part A
[AD-A127538] N83-32662

PRODUCT DEVELOPMENT
Phosphorus-containing imide resins
[NASA-CASE-ARC-11368-1] N83-31854
NBS (National Bureau of Standards) and industrial biotechnology: Instrumentation and associated measurement needs
[PB83-191114] N83-32285
An application of a computer optical design program
[AD-A127857] N83-32375
High-brightness negative-hydrogen linear accelerator
[DE83-003565] N83-32545

PRODUCTION ENGINEERING
Problem of corrosion-resistant steels
[BLL-M-26995-(5828.4)] N83-31810
Flexible manufacturing system handbook. Volume 2: Description of the technology
[AD-A127928] N83-31900

PRODUCTION MANAGEMENT
State of production of bimetals and prospects for its development
[BLL-M-35010-(5828.4)] N83-31800
Aggregates, activities and overheads
[AD-A127830] N83-32477
Algorithms and heuristics for variable-yield lot-sizing
[AD-A127559] N83-32478

PRODUCTIVITY
Automation in the workplace, its impact on the labor force, and the role of labor market planning for policymaking N83-32312
Federal agencies could save time and money with better computer software alternatives
[GAO/AFMD-83-29] N83-32350

PROFILES
Atmospheric temperature profiles from Earth limb infrared measurements
[AD-A127536] N83-32214

PROGRAM VERIFICATION (COMPUTERS)
Recommended approach to sofware development
[NASA-TM-85396] N83-32355
Experiences and perspectives with SRI's tools for software design and validation N83-32361
Classifying bugs is a tricky business N83-32365
A deductive approach to the debugging, verification and modification of programs
[AD-A127900] N83-32373

PROGRAMMING
Problems associated with the implementation of management control systems
[AD-A127254] N83-32658

PROGRAMMING LANGUAGES
General-purpose stepping motor-encoder positioning subsystem with standard asychronous serial-line interface
[DE83-004634] N83-31987
Taxonomy of tool features for the Ada (trade name) Programming Support Environment (APSE)
[PB83-179002] N83-32349

PROJECT MANAGEMENT
Configuration Analysis Tool (CAT). System Description and users guide (revision 1)
[NASA-TM-85398] N83-32370

PROJECTILES
Grid network generation with adaptive boundary points for projectiles at transonic speed
[AD-A128041] N83-31584

PROPAGATION
Extraction and propagation of an intense rotating electron beam
[AD-A127018] N83-32523

PROPAGATION VELOCITY
Drag instability in the modified betatron
[AD-A128242] N83-32526

PROPANE
Investigation of axisymmetric buoyant turbulent diffusion flames: Turbulence properties and concentrations of major species
[PB83-175612] N83-31915

PROPELLANT COMBUSTION
Holographic investigation of solid propellant combustion particulates
[AD-A127841] N83-32029

PROPELLANTS
Post accident procedures for chemicals and propellants
[AD-A127505] N83-32661

PROPELLERS
Contribution to the aerodynamic study of wings and propellers
[NASA-TM-77083] N83-31579

PROPULSION SYSTEM PERFORMANCE
Air Force Academy Aeronautics Digest, Spring/Summer 1982
[AD-A128248] N83-31571
The 1983 AFOSR/AFRPL Chemical Rocket Research Meeting
[AD-A127812] N83-31756

PROTECTIVE COATINGS
Silicon-slurry/aluminide coating --- protecting gas turbine engine vanes and blades
[NASA-CASE-13343-2] N83-31795
Effectiveness of boriding of steel in molten sodium-boron-silicate baths
[BLL-M-34988-(5828.4)] N83-31803
Protective coatings for marine cables
[BLL-M-34971-(5828.4)] N83-31812

PROTECTORS
The cooling unit for the closed box N83-32507

PROTEIN SYNTHESIS
Data processing in neutron protein crystallography using positron-sensitive detectors
[DE83-005803] N83-32636

PROTON MAGNETIC RESONANCE
Magnetic-resonance studies of reactively sputtered amorphous silicon-hydrogen alloys
[DE83-004958] N83-31842

PROTON-PROTON REACTIONS
Determination of the angular and energy dependence of hard constituent scattering from pi-O pair events at the CERN intersecting storage rings
[DE83-002451] N83-32538
Charge correlations in deep inelastic proton-proton interactions at the CERN ISR: The axial field spectrometer collaboration
[DE83-002324] N83-32539

PROTOTYPES
The development of a programming support system for rapid prototyping
[AD-A128251] N83-32386

PROVING
Fusion-power demonstration
[DE83-010370] N83-32609

PSYCHOLOGICAL EFFECTS
Star City astronaut training center N83-31622

PSYCHOLOGICAL FACTORS
Methodological contributions of person perception to performance appraisal
[AD-A128638] N83-32311
Women at sea: Welcome aboard
[AD-A128602] N83-32646

PSYCHOLOGY
Computational introspection
[AD-A127132] N83-32399

PSYCHOPHARMACOLOGY
Psychopharmacological techniques for optimizing human performances
[AD-A128529] N83-32309
PSYCHOPHYSIOLOGY
Small groups programmed environments: Behavioral and biological interactions
[NASA-CR-172853] N83-32306
PUBLIC HEALTH
Laser applications present and future: Prospects for significant occupational safety and health impact
[PB83-184507] N83-32066
PULSE COMMUNICATION
Digital communications in spatially distributed interference channels
[AD-A127741] N83-31943
PULSE DURATION
Picosecond X-ray generation from picosecond photoelectron pulses
[AD-A128031] N83-32586
PULSE GENERATORS
Design philosophy for high-resolution rate and throughput spectroscopy systems
[DE83-004117] N83-31782
High efficiency picosecond pulse generation in the 375-930 NM region from a dye laser synchronously pumped by an argon-ion laser
[AD A128033] N83-32058
Picosecond X-ray generation from picosecond photoelectron pulses
[AD-A128031] N83-32586
PULSE RADAR
Clutter processing of SEEK IGLOO: A modern long range 3-D radar
[AD-A127520] N83-31937
PULSES
Impulse response of the ocean floor nonlinear techniques for measurement enhancement
[AD-A128578] N83-32269
PUMP SEALS
High speed cryogenic self-acting, shaft seals for liquid rocket turbopumps
[NASA-CR-168194] N83-32070
PUMPS
Development and testing of a submersible motor pump driven by a solar cell generator
[BMFT-FB-T-83-081] N83-32074
Preliminary investigation of interconnected systems interactions for the safety injection system of Indian Point-3
[DE83-009172] N83-32451
PURIFICATION
Catalyst for exhaust-gas purification
[DE83-005019] N83-31770
Analysis of gas purification by heatless adsorption
[DE83-003965] N83-31783
PURITY
High-purity germanium crystal growing
[DE83-004181] N83-32632
PYROLYSIS
Thin films from ammonia-borane
[DE83-003567] N83-32628
PYROTECHNICS
IR and visible wavelength obscuration by pyrotechnically generated alkali-halide smokes
[AD-A127616] N83-32581
PYRROLES
Polymer films on electrodes. Part 13: Incorporation of catalysts into electronically conductive polymers: Iron phthalocyanine in polypyrrole
[AD-A127700] N83-31863

Q

QUALITY CONTROL
Composites in ground test services — aircraft manufacturing
[BAE-KGT-N-GEN-00999] N83-31729
Integration analysis: A proposed integration of test and evaluation techniques for early on detection of human factors engineering discrepancies
[AD-A127611] N83-32314
A survey of software quality assurance methods and an evaluation of software quality assurance at Fleet Material Support Office
[AD-A127676] N83-32378
Quality assurance program for isotopic power systems
[DE83-005250] N83-32560
USSR report: Science and technology policy, no. 9
[JPRS-82713] N83-32647
Nondestructive quality control discussed N83-32651
QUANTILES
FUN.STAT quantile approach to two sample statistical data analysis
[AD-A127672] N83-32467
QUANTUM CHROMODYNAMICS
Determination of the angular and energy dependence of hard constituent scattering from pi-O pair events at the CERN intersecting storage rings
[DE83-002451] N83-32538
Testing quantum chromodynamics
[DE83-004391] N83-32555
Why QCD lattice theory is important to spin physicists
[DE83-003955] N83-32638
QUANTUM MECHANICS
Classical and semiclassical aspects of chemical dynamics
[DE83-0002024] N83-31766
Rotational temperature measurements in free jet expansions on N sub 2 using electron beam fluorescence technique N83-32496
QUARKS
Detecting heavy quarks
[DE83-011365] N83-32561
QUASARS
A program of ground-based astronomy to complement Einstein observations
[AD-A127148] N83-32691
QUENCHING (COOLING)
Transmission of an explosion through an orifice N83-32024

R

RADAR IMAGERY
Multibeam single frequency synthetic aperture radar processor for imaging separate range swaths
[NASA-CASE-NPO-14525-2] N83-31918
RADAR TRACKING
Tonopah Test Range capabilities: Technical manual
[DE83-005362] N83-31709
Southwest PAVE PAWS radar system: Environmental assessment
[AD-A128554] N83-31945
RADIANCE
Comparison of modelled and empirical atmospheric propagation data
[E83-10398] N83-32146
Suitability of a wall-stabilized arc as a transfer standard of spectral radiance in the spectral range 165 to 350 nm
[NPL-QU-65] N83-32479
RADIANT HEATING
Gamma bursts
[DE83-004810] N83-32704
RADIATION COUNTERS
Report on solar-neutrino experiments
[DE83-001306] N83-32543
RADIATION DETECTORS
Mini-MCA: An intelligent inspection instrument
[DE83-001979] N83-32038
Detecting heavy quarks
[DE83-011365] N83-32561
High-purity germanium crystal growing
[DE83-004181] N83-32632
RADIATION DOSAGE
Bioeffects of radiofrequency radiation: A review pertinent to Air Force operations
[AD-A128515] N83-32293
Development and application of the discrete ordinates-transfer matrix hybrid method for deterministic streaming calculations
[DE82-017387] N83-32457
RADIATION EFFECTS
Effects of irradiation on ceramics for fusion-reactor applications
[DE83-009468] N83-31872
Theory of collision-induced ionization of adsorbed species on solid surfaces in the presence of laser radiation
[AD-A128317] N83-32059
The thermal basis for disruption of operant behavior by microwaves in three animal species
[AD-A127370] N83-32279
Operant behavior and colonic temperature of rhesus monkeys, Macaca mulatta, exposed to microwaves at frequencies above and near whole-body resonance
[AD-A127326] N83-32280
Temperature cycling in rats exposed repetitively to radiofrequency radiation
[AD-A126895] N83-32281
Retrograde amnesia, in rats, produced by electron beam exposure
[AD-A126870] N83-32282
Bioeffects of radiofrequency radiation: A review pertinent to Air Force operations
[AD-A128515] N83-32293
Transverse and quantum effects in superfluorescence: Pump dynamics for three-level superfluorescence; An algorithm for transverse, full transient effects in optical bistability in a Fabry-Perot cavity
[AD-A127502] N83-32584
Cosmic ray effects on microelectronics. Part 2: The geomagnetic cutoff effects *
[AD-A128601] N83-32703
RADIATION HAZARDS
Southwest PAVE PAWS radar system: Environmental assessment
[AD-A128554] N83-31945
Critical considerations in the assessment of health and environmental risks: What we have learned from the nuclear experience
[DE83-005292] N83-32194
RADIATION MEASURING INSTRUMENTS
Cloud cover sensor
[NASA-CASE-NPO-14936-1] N83-32232
RADIATION PROTECTION
The problems of protection against optical radiation
[BR88714] N83-32287
RADIATIVE HEAT TRANSFER
Heat-transfer characteristics of dry porous particulate beds with internal heat generation — for reactor safety considerations N83-32012
RADIATIVE TRANSFER
LANDSAT-D investigations in snow hydrology — Sierra Nevada Mountains
[E83-10382] N83-32135
Evaluation of spatial, radiometric and spectral thematic mapper performance for coastal studies
[E83-10386] N83-32139
LANDSAT-D investigations in snow hydrology — Sierra Nevada Mountains, California
[E83-10388] N83-32141
Accurate, practical simulation of satellite infrared radiometer spectral data
[DE83-002506] N83-32221
RADICALS
Kinetics and mechanisms of the reactions of aliphatic free radicals with organocobaloximes and fluoropentaammine cobalt (III) ion and of iron (III) with methyrodoxime
[DE83-004856] N83-31779
RADIO COMMUNICATION
Tonopah Test Range capabilities: Technical manual
[DE83-005362] N83-31709
RADIO FREQUENCIES
Wideband HF channel prober: System description
[AD-A127040] N83-31924
A 500-watt solid-state RF power amplifier AM-7209( )/VRC
[AD-A127462] N83-31965
Temperature cycling in rats exposed repetitively to radiofrequency radiation
[AD-A126895] N83-32281
Bioeffects of radiofrequency radiation: A review pertinent to Air Force operations
[AD-A128515] N83-32293
RADIO FREQUENCY HEATING
Gyrotron transmitting tube
[NASA-CASE-LEW-13429-1] N83-31952
RADIO SOURCES (ASTRONOMY)
Saturn as a radio source
[NASA-TM-85023] N83-32695
RADIO TRANSMISSION
ELF PVS field strength measurements, October 1977
[AD-A128196] N83-31930
RADIO TRANSMITTERS
Wideband HF channel prober: System description
[AD-A127040] N83-31924
A 500-watt solid-state RF power amplifier AM-7209( )/VRC
[AD-A127462] N83-31965
RADIO WAVES
Interaction of solar wind with magnetosphere of Venus N83-31627
RADIOACTIVE CONTAMINANTS
Simplified methods for the inelastic analysis and reliability assessment of stiffened shells — for nuclear power plant containment vessels
[DE83-004966] N83-32100
RADIOACTIVE DECAY
Measurement of strange quark suppression in hadronic vacuum
[DE83-000918] N83-32548
Detecting heavy quarks
[DE83-011365] N83-32561
RADIOACTIVE ISOTOPES
Flight-systems safety program
[DE83-001916] N83-32575
RADIOACTIVE WASTES
Relationship of an in-situ test facility to a deep geologic repository for high-level nuclear waste, task 4
[DE83-901818] N83-31726

Microstructural characterization of nuclear-waste ceramics
[DE83-000362] N83-31860
Geotechnical instrumentation requirements for at-depth testing and repository monitoring in tuff
[DE83-002188] N83-32034
Review of ground-water flow and transport models in the unsaturated zone
[DE83-004256] N83-32158
Review and evaluation of paleohydrologic methodologies
[DE83-004572] N83-32159
Analysis of geothermal wastes for hazardous components
[PB83-188680] N83-32203
Intraplate seismicity and seismic risk in the Atlantic Ocean based on teleseismically observed earthquakes
[IOS-136] N83-32227
Regional low-level radioactive waste disposal sites: Progress being made but new sites will probably not be ready by 1986
[GAO/RCED-83-48] N83-32563
Corrosion resistant canisters for nuclear waste isolation
[DE83-000090] N83-32564
Thermal impact of waste emplacement and surface cooling associated with geologic disposal of nuclear waste
[DE83-007314] N83-32565
Disposal costs for SRP high-level wastes in borosilicate glass and crystalline ceramic waste forms
[DE83-003105] N83-32567
Nuclear-waste disposal: Technical issues and status
[DE83-002185] N83-32568
Biological intrusion barriers for large-volume waste-disposal sites
[DE83-002061] N83-32571
Environmental evaluation of alternatives for long-term management of Defense high-level radioactive wastes at the Idaho Chemical Processing Plant
[DE83-002504] N83-32572
Assessment of spent-fuel waste-form/stabilizer alternatives for geologic disposal
[DE83-002458] N83-32573
Overview assessment of nuclear-waste management
[DE83-004472] N83-32574
Relevance of biotic pathways to the long-term regulation of nuclear-waste disposal. Topical Report on reference western arid low-level sites
[DE83-002575] N83-32576
Thermal-gradient migration of brine inclusions in salt crystals
[DE83-004180] N83-32633

RADIOBIOLOGY
Ideas on the unification of radiobiological theories
[DE83-004188] N83-32283

RADIOMETERS
K-band radiometric mapping of sea ice
[AD-A128205] N83-32268

RADIOMETRIC CORRECTION
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration
[E83-10389] N83-32142

RADIOMETRIC RESOLUTION
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E83-10373] N83-32128
A preliminary evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies
[E83-10383] N83-32136
Evaluation of spatial, radiometric and spectral thematic mapper performance for coastal studies
[E83-10386] N83-32139
Impact of LANDSAT MSS sensor differences on change detection analysis
[E83-10395] N83-32145

RAIN
Rain-induced spring wheat harvest losses
[E83-10377] N83-32130

RAMJET ENGINES
Combustion dynamics in rockets
[AD-A127129] N83-31721

RANDOM VARIABLES
Some generalizations of the renewal process
[AD-A127522] N83-32431
Limit laws for the maximum of weighted and shifted I.I.D. random variables
[AD-A128359] N83-32438
Characterizations of multivariate classes of life distributions
[AD-A127783] N83-32471

RANGE (EXTREMES)
A new method for the analysis of extremes applicable to one year's data --- wave height return values
[IOS-142] N83-32272

RANGE SAFETY
Flight termination system equipment. Volume 3: Relays, timers, and switches
[AD-A127479] N83-31708

RARE EARTH COMPOUNDS
Permanent magnet undulators
[DE83-003590] N83-32511

RARE EARTH ELEMENTS
Spectroscopic properties of the f-elements in compounds and solutions
[DE83-007963] N83-31759

RARE GASES
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible
[AD-A128534] N83-32062
Third-harmonic generation for photoionization studies
[DE83-001960] N83-32544

RAREFACTION
Rarefaction phenomena in gas ans isotope separation N83-32501

RAREFIED GASES
Recent developments in the investigations on the gas-surface interactions N83-32499

RATIONAL FUNCTIONS
Symmetrisable operators and minimal factorization N83-32320

RAYLEIGH DISTRIBUTION
Maintenance estimation methodology N83-32367

RAYLEIGH NUMBER
Convection coefficients at building surfaces
[DE83-002572] N83-32015

RAYLEIGH SCATTERING
High speed cryogenic self-acting, shaft seals for liquid rocket turbopumps
[NASA-CR-168194] N83-32070

REACTION KINETICS
An analysis of the driving forces in liquid phase sintering N83-31691
Densification kinetics of shock-activated nitrides
[DE83-003008] N83-31742
Kinetics and mechanisms of the reactions of aliphatic free radicals with organocobaloximes and fluoropentaamminecobalt (III) ion and of iron (III) with methyrodoxime
[DE83-004856] N83-31779
Kinetics of the reduction of calcium sulfate with carbon monoxide and hydrogen
[DE83-004963] N83-31780
Hydrogenation of carbon monoxide over ruthenium-rhenium on alumina catalysts
[DE83-004975] N83-31785
Electrocatalysis on ion-implanted electrodes
[DE82-015768] N83-31787
Numerical simulation of turbulent flame and pressure development in gas explosions
[PB83-177832] N83-31790
Diffusion of hydrogen and deuterium in Zr-Al
[DE83-002214] N83-31829
Early stages of sulfidation of iron and iron-chromium alloy in hydrogen sulfide
[DE83-004969] N83-31837
Irreversible cooperative processes on lattices
[DE83-004795] N83-31878
Low-pressure transfer operations
[DE83-003443] N83-32011
Holographic methods for the investigation of photophysical properties
[AD-A128510] N83-32032
Proceedings of the Symposium on Mechanics for Space Flight
[ISAS-SP-1] N83-32480

REACTIVITY
Characteristics and use of the transient reactivity meter
[DE83-003726] N83-32040

REACTOR CORES
Melt fingers and pool penetration into a miscible substrate --- for application to the design of post-accident core retention systems for nuclear reactors
[DE83-004511] N83-31768

REACTOR MATERIALS
High-temperature elastic-plastic and creep properties for SA533 Grade B Class I and SA508 materials
[DE83-901103] N83-32114

REACTOR PHYSICS
Characteristics and use of the transient reactivity meter
[DE83-003726] N83-32040

REACTOR SAFETY
Heat-transfer characteristics of dry porous particulate beds with internal heat generation --- for reactor safety considerations N83-32012

REACTOR TECHNOLOGY
Effects of irradiation on ceramics for fusion-reactor applications
[DE83-009468] N83-31872

REAL TIME OPERATION
Oak Ridge beam-analysis system
[DE83002587] N83-32035
Automated on-line L-edge measurement of SNM concentration for near-real-time accounting
[DE83-000666] N83-32039
Design Aids for Real-Time Systems (DARTS) N83-32363
Real-time implementation of nonlinear optical processing functions
[AD-A127024] N83-32579

RECORDING INSTRUMENTS
Negative phase sequence recorder based on a single chip microcomputer
[PB83-184689] N83-32043

RECRYSTALLIZATION
Motive forces of structural changes in ferrosilicon during heating after slight deformations
[BLL-M-35039-(5828.4)] N83-31799

RECTANGLES
Two orthogonal (v/2)x2v F-rectangle for all even v
[AD-A127948] N83-32433

RECURSIVE FUNCTIONS
BAYR, a data association algorithm based on a Bayesian recursion
[AD-A127460] N83-32488

RECYCLING
Reconstituted Charpy impact specimens
[DE83-901113] N83-32113

REDUCED GRAVITY
Materials Sciences Under Microgravity --- conferences
[ESA-SP-191] N83-31637
Fluid physics under reduced gravity: An overview --- Spacelab experiments N83-31638
New features of the European microgravity programs N83-31639
Metallic composite materials and microgravity N83-31641
Particle transport induced by directional solidification --- STS 7 N83-31642
Bubble motion under reduced gravity N83-31644
On thermally-driven movement of drops in microgravity conditions N83-31645
The behavior of a metallic dispersion under microgravity conditions N83-31647
On the nucleation of melts under microgravity conditions N83-31649
Scientific goals of the D1-mission --- Spacelab experiment N83-31650
Development of advanced heating facility concepts for microgravity application N83-31653
Technical implications of a flight experiment design --- for microgravity experiments N83-31657
Minizone image furnace --- for reduced gravity experiments N83-31658
Thermodynamics of irreversible processes in molten salts: Problems of interdiffusion measurements under microgravity N83-31662
Reactions in glass melt systems --- in microgravity N83-31663
Combustion experiments under microgravity N83-31665
Fundamental combustion experiments in microgravity N83-31666
Studies of experiments on droplet burning at reduced gravity N83-31667
The influence on the Marangoni effect of a surface tension minimum as a function of temperature in microgravity conditions N83-31669
Measurement of the critical Marangoni number in a floating zone under reduced gravity N83-31671
Conservation laws for liquid bridges N83-31677
Convection-Marangoni effects in solidification-microgravity N83-31681
Low-gravity experiments on Liquid Phase Miscibility Gap (LPMG) alloys: Materials Experiments Assembly (MEA) N83-31685
Soldering under microgravity N83-31690
Oscillatory convection in a spherical cavity due to g-jitter N83-31694
Optical investigation of critical behavior in simple fluids at reduced gravity N83-31696
Electrolyte solutions near the critical point of water: A review and proposal for studies under microgravity conditions N83-31698
Thermal conductivity measurement on fluids under microgravity using holographic interferometry N83-31699
Solidification of PbSn alloys under microgravity conditions N83-31701
Directional crystallization of Pb Te under microgravity conditions N83-31703

REDUCTION (CHEMISTRY)
Hydrodesulfurization of chlorinized coal
[NASA-CASE-NPO-15304-1] N83-31743

REFLECTANCE
Polarized-neutron spectrometer development and experiments at Brookhaven
[DE83-000978] N83-32041
The equivalence of three techniques for estimating ground reflectance from LANDSAT digital count data
[E83-10378] N83-32131
REFLECTION
Self-reflecting skew polygons and polytopes in the 4-dimensional hypercube
[AD-A127762] N83-32443
REFRACTION
Synthetic seismogram modeling
[AD-A128305] N83-32218
The net effect of many gravitational fields on the intensity of celestial light sources
[AD-A127514] N83-32694
REFRACTIVITY
Analysis of laser-turbulence utilizing a video tape recorder and digital storage oscilloscope
[AD-A127859] N83-32049
REFRACTORY METAL ALLOYS
Electroplating of refractory metals and alloys from fluoride melt
[AD-A127116] N83-31819
REFRIGERATING MACHINERY
Cycling Joule Thomson refrigerator
[NASA-CASE-NPO-15251-1] N83-31897
Vibration isolation and pressure compensation apparatus for sensitive instrumentation
[NASA-CASE-LAR-12728-1] N83-32026
REGENERATION (ENGINEERING)
On confidence intervals for cyclic regenerative processes
[AD-A127761] N83-32444
REGISTERS (COMPUTERS)
Illinois I/O register to FASTBUS interface
[DE83-007330] N83-32389
REGRESSION ANALYSIS
Non-linear data fitting for analysis of friction stress and recovery in metal alloys
[NPL-DITC-13/82] N83-32093
Predicting the acceleration of northward-moving tropical cyclones using upper-tropospheric winds
[AD-A127446] N83-32235
Forcing regression through a given point using any familiar computational routine
[AD-A127868] N83-32416
Least absolute deviations regression
[DE83-004424] N83-32456
Bayesian models for response surfaces of uncertain functional form
[AD-A127703] N83-32465
REGULATIONS
Safety engineering: KTA code of practice. Lifting mechanisms in nuclear plant
[BLL-CE-TRANS-7880-(9022.09)] N83-31898
Analysis of geothermal wastes for hazardous components
[PB83-188680] N83-32203
REGULATORS
Plant step data and gain estimates in the robust feedback tuning regulator problem
[RR-211] N83-31991
Robust sampled regulators for stable systems from plant step data
[RR-213] N83-32459
REINFORCED PLASTICS
Structural plastics design manual. Volume 2: Phases 2 and 3, chapters 5 - 10
[PB83-185595] N83-31885
RELATIVISTIC ELECTRON BEAMS
Transition radiation: A possible diagnostic tool for relativistic electrons at Sandia
[DE83-006844] N83-32533
Influence of centering forces on IFR hose instability
[DE83-006719] N83-32536
RELATIVISTIC PARTICLES
Coulomb dissociation in relativistic heavy-ion reactions
[DE83-005004] N83-32557
RELAXATION (MECHANICS)
Brownian-dynamics computer simulations of one dimensional polymer model. 1: Simple potentials
[DE83-002468] N83-31877
RELIABILITY
CAD/CAM handbook for polymer composite reliability, volume 1
[AD-A127720] N83-31865
Algebraic approximation of event tree sequences
[DE82-022169] N83-32452
RELIABILITY ANALYSIS
Relationship between manufacturing yields and field failure rates of electronic equipment
[AD-A128498] N83-32078
Comparison of algorithms for computing generating-system reliability indexes
[DE83-901863] N83-32079
Indirect solar wind geothermal: Alternative energy sources 4, volume 4
[LC-82-71533] N83-32179
Performance analysis of the Jersey City Total Energy Site
[PB83-185348] N83-32187
Failure detection with uncertain models
[NASA-CR-172835] N83-32417
Some generalizations of the renewal process
[AD-A127522] N83-32431
A class of multivariate new better than used processes
[AD-A127535] N83-32469
RELIABILITY ENGINEERING
Commentary on Astron satellite N83-31624
When and how to use a software reliability model N83-32359
Quality assurance program for isotopic power systems
[DE83-005250] N83-32580
REMOTE HANDLING
Conceptual design report for a fusion engineering device
[DE83-002288] N83-32602
REMOTE SENSING
USSR report: Space, no. 23
[JPRS-83994] N83-31617
Space survey techniques benefit geology N83-31630
Remote sensing determination of hydrograph recession characteristics
[PB83-186627] N83-32170
Use of remote sensing techniques and the universal soil loss equation to determine soil erosion
[PB83-182006] N83-32172
REMOTE SENSORS
Laser-based instrumentation for the detection of chemical agents
[DE83-003538] N83-32036
Coherent laser radar remote sensing
[AD-A127717] N83-32053
REMOVAL
Study of the causes of unnecessary removals of avionic equipment
[AD-A127546] N83-31570
REPORT GENERATORS
An approach for implementing a microcomputer based report origination system in the Ada programming language
[AD-A128028] N83-32383
REPORTS
Bibliography of technical reports, 1962
[PB83-191064] N83-32274
NASA publications guide
[NASA-SP-7047] N83-32671
REPRODUCTION (BIOLOGY)
Commentaries on successful plant growing experiments on Salyut-7 N83-31628
Peculiarities in formation of Arabidopsis Thaliana (L.) Heynh, generative organs under space flight conditions
[NASA-TM-77263] N83-32277
Revised update and retrieval system for the calcofi oceanographic data file
[PB83-189464] N83-32675
RESCUE OPERATIONS
An evaluation of SARP (search and rescue planning system) drift predictions using satellite-tracked drift-buoys
[AD-A127987] N83-31588
RESEARCH
NBS (National Bureau of Standards) and industrial biotechnology: Instrumentation and associated measurement needs
[PB83-191114] N83-32285
Search for new heavy techniparticles
[DE83-003945] N83-32551
Lattice guage theories
[DE83-002827] N83-32639
A summary of the foundation research program, FY 1982
[AD-A127995] N83-32663
Space research in Norway
[SAD-102-T] N83-32689
RESEARCH AND DEVELOPMENT
New features of the European microgravity programs N83-31639
The challenge for metrology in the R&D environment
[DE83-003101] N83-31907
USSR report: Science and technology policy, no. 9
[JPRS-82713] N83-32647
Methods discussed for accelerating adoption of scientific achievements N83-32648
R&D acitivities of Belorussian SSR Academy of Sciences described N83-32654
RESEARCH FACILITIES
Cosmonaut training simulators at Zvezdnyy Gorodok described N83-31623
Better results from development of technical equipment N83-32649
RESEARCH MANAGEMENT
Workshop for the Winter Monsoon Experiment
[AD-A127989] N83-32239
Interaction Between Objective Analysis and Initialization. Proceedings of the 14th Stanstead Seminar
[PB83-186890] N83-32256
Research studies on radiative collisional processes
[AD-A128533] N83-32509
USSR report: Science and technology policy, no. 9
[JPRS-82713] N83-32647
Methods discussed for accelerating adoption of scientific achievements N83-32648
Better results from development of technical equipment N83-32649
A summary of the foundation research program, FY 1982
[AD-A127995] N83-32663
Multiprogram Laboratory Panel Energy Research Advisory Board. Volume 2: Support studies
[DE83-002694] N83-32668
Roles of industry and the university in computer research and development
[PB83-192039] N83-32670
Authorizing appropriations to the National Science Foundation
[H-REPT-98-73] N83-32684
RESERVOIRS
Evaluation of the North Stanley Polymer Demonstration Project
[DE83-006915] N83-31876
RESIDENTIAL ENERGY
Energy conservation for housing: A workbook
[PB83-185330] N83-32186
RESIDUAL STRESS
Residual-stress characterization by use of elastic-wave-scattering measurements
[DE83-000647] N83-31985
A general purpose residual stress analyzer
[AD-A127820] N83-32109
The measurement of X-ray residual stress in textured cubic materials
[AD-A127822] N83-32620
RESIDUES
Emission characteristics of a medium-speed diesel using water-emulsified residual fluids
[DE83-001552] N83-32073
RESINS
Phosphorus-containing imide resins
[NASA-CASE-ARC-11368-1] N83-31854
RESONANCE
Quasiresonance of long life
[AD-A127763] N83-32442
RESONANCE FLUORESCENCE
Electromagnetic mirror dynamics
[AD-A127515] N83-31938
RESOURCES MANAGEMENT
Water conservation: An update of federal activity N83-32148
Global trends in population and resources
[GPO-96-841] N83-32149
Integrated resource inventory for southcentral Alaska (INTRISCA)
[NASA-CR-166514] N83-32150
Evaluation of water conservation techniques in the Upper Colorado River Basin
[PB83-175315] N83-32164
RETENTION (PSYCHOLOGY)
Retrograde amnesia, in rats, produced by electron beam exposure
[AD-A126870] N83-32282
Private pilot flight skill retention 8, 16 and 24 months following certification
[DOT/FAA/CT-83/34] N83-32303
RETINA
Detection of retinal ischemia prior to blackout by electrical evoked cortical responses
[AD-A126855] N83-32288
REVERSE FIELD PINCH
Adiabatic compression of elongated field-reversed configurations
[DE83-003533] N83-32604
Burn dynamic experiment based on the field-reversed theta pinch
[DE83-005071] N83-32607
REYNOLDS NUMBER
Preliminary engineering study: Quick opening valve MSFC high Reynolds number wind tunnel
[NASA-CR-170845] N83-31612
Liquid transfer and entrainment correlation for droplet-annular flow
[DE83-007703] N83-32019

RHENIUM ALLOYS
Hydrogenation of carbon monoxide over ruthenium-rhenium on alumina catalysts
[DE83-004975] N83-31785
RHEOLOGY
Computer-aided design and fabrication of molds and computer control of injection molding
[PB83-187955] N83-31914
Rheology via nonequilibrium molecular dynamics
[DE83-004302] N83-32558
RHODIUM
Observation of a first-order phase transition in single-crystal ErRh-4B4 at Hc-2
[DE83-008609] N83-32623
RICCATI EQUATION
The algebraic Riccati equation: A summary review of some available results --- optimal control problems
[NPL-DITC-23/83] N83-32405
RIGID STRUCTURES
Simplified methods for the inelastic analysis and reliability assessment of stiffened shells --- for nuclear power plant containment vessels
[DE83-004966] N83-32100
Buckling of steel containment shells. Task 4: Use of the PANDA program for simple buckling analyses of stiffened cylindrical shells
[DE83-900980] N83-32115
RING LASERS
Ultra-stable laser clock
[AD-A127519] N83-32054
RING STRUCTURES
Irreversible cooperative processes on lattices
[DE83-004795] N83-31878
RISK
Intraplate seismicity and seismic risk in the Atlantic Ocean based on teleseismically observed earthquakes
[IOS-136] N83-32227
ROBOTS
Dynamic scaling of manipulator trajectories
[AD-A127074] N83-32313
An expert distributed robotics system with comprehension and learning abilities in the aircraft flight domain
[AD-A127739] N83-32401
European Scientific Notes, volume 37, number 1
[AD-A126961] N83-32672
ROBUSTNESS (MATHEMATICS)
Robustness with simultaneous pole and zero movement across the j-omega axis
[OUEL-1465/83] N83-32404
Robust sampled regulators for stable systems from plant step data
[RR-213] N83-32459
ROCKET ENGINES
The 1983 AFOSR/AFRPL Chemical Rocket Research Meeting
[AD-A127812] N83-31756
Nondestructive inspection and measurement
[AD-A127971] N83-32077
Oxyhydrogen ignition and flame propagation under cryogenic temperatures N83-32484
ROCKET LAUNCHERS
Nondestructive inspection and measurement
[AD-A127971] N83-32077
ROCKET NOZZLES
Computation of two-dimensional, transonic, chemically reacting nonequilibrium flow in a rocket nozzle N83-32487
ROCKET PROPELLANTS
Detecting monomethylhydrazine rocket fuel vapors with the MDA model 3060 autospot automatic toxic gas detector
[AD-A127512] N83-31722
ROCKET-BORNE INSTRUMENTS
Sounding-rocket flight test of an acoustic mixer by manufacture of a lead-zinc emulsion alloy in microgravity N83-31652
ROLL FORMING
Analysis of experimental data on rolling of corrosion-resistant steel with hydraulic thrust
[BLL-M-35007-(5828.4)] N83-31806
Influence of temperature-deformation conditions on mechanical properties of rolled plate after straightening
[BLL-M-26987-(5828.4)] N83-31809
Use of sleeved rolls in a blooming mill
[BMFT-FB-T-83-042] N83-31908
ROOTS OF EQUATIONS
Binocular shading and visual surface reconstruction
[AD-A127058] N83-32580
ROTATING BODIES
Almost cylindrical isorotating liquid bridges for small bond numbers N83-31676
ROTATING FLUIDS
Remarks on thermal properties of rotating superfluid helium in a gravitational field N83-32502
ROTATION
Rotational and irrotational freestream disturbances interacting inviscidly with a semi-infinite plate
[AD-A127009] N83-31998
System for controlled acoustic rotation of objects
[NASA-CASE-NPO-15522-1] N83-32516
Extraction and propagation of an intense rotating electron beam
[AD-A127018] N83-32523
Current analysis for rotating and vibrating heavy nuclei
[DE83-000612] N83-32637
RUBBER
Fracture toughness of polybutadiene at cryogenic temperatures
[AD-A126999] N83-31658
RUN TIME (COMPUTERS)
A case study in writing efficient programs
[AD-A127572] N83-32376
RUNWAYS
Software description for the O'Hare runway configuration management system. Volume 2: Low-level pseudocode
[AD-A127828] N83-31592
Optimization of long range major rehabilitation of airfield pavements
[AD-A127579] N83-31613
Evaluation of design criterion of the strategic expeditionary landing field
[AD-A128323] N83-31614
RUTHENIUM ALLOYS
Hydrogenation of carbon monoxide over ruthenium-rhenium on alumina catalysts
[DE83-004975] N83-31785
RUTHENIUM COMPOUNDS
The crystal and molcular structures of selected ruthenium (II) phosphate complexes and vinyl bromide-benzothiophene adducts
[DE83-004788] N83-32635

S

SAFETY
Preliminary investigation of interconnected systems interactions for the safety injection system of Indian Point-3
[DE83-009172] N83-32451
SAFETY FACTORS
Safety engineering: KTA code of practice. Lifting mechanisms in nuclear plant
[BLL-CE-TRANS-7880-(9022.09)] N83-31898
In-depth survey report of American Airlines plating facility
[PB83-187799] N83-31916
Laser applications present and future: Prospects for significant occupational safety and health impact
[PB83-184507] N83-32066
SALINITY
Proline metabolism in plants under environmental stresses
[DE83-002735] N83-32284
SALT BEDS
Thermal-gradient migration of brine inclusions in salt crystals
[DE83-004180] N83-32633
SALTS
Characterization of internal sales by laser desorption mass spectrometry
[AD-A127916] N83-31746
SALYUT SPACE STATION
USSR report: Space, no. 23
[JPRS-83994] N83-31617
Commentary on Soyuz T-8 rendezvous failure N83-31619
Salyut-7 passes one year in orbit mark N83-31620
Ryumin interviewed on Salyut experiments N83-31621
Commentaries on successful plant growing experiments on Salyut-7 N83-31628
Rendezvous in space N83-31629
Experiments on crystallization of semiconductors aboard Salyut 6: Soyuz orbital complex N83-31688
The main results of the space material science experiments within the framework of Intercosmos program N83-31700
SAMARIUM
Dependence of lattice spacings of the SmCo5 phase on quenching temperature
[BLL-M-34952-(5828.4)] N83-31804
SAMPLES
A small sample evaluation of a Bayesian design method for quantal response model
[AD-A127942] N83-32464
FUN.STAT quantile approach to two sample statistical data analysis
[AD-A127672] N83-32467
SAMPLING
Comparison of algorithms for computing generating-system reliability indexes
[DE83-901863] N83-32079
Frequency response of finite-aperature sample-and-hold systems
[DE83-002279] N83-32348
SANDS
Experimental observations of shear patterns in direct shear tests
[PB83-187351] N83-31917
Geology and engineering characteristics of selected low-permeability gas sands: A survey
[PB83-195099] N83-32230
SATELLITE ATMOSPHERES
Outer satellite atmospheres: Their nature and planetary interactions
[NASA-CR-172945] N83-32696
SATELLITE COMMUNICATIONS SHIPS
Flight control center's history, functions spotlighted N83-31626
SATELLITE CONTROL
Software errors and complexity: An empirical investigation N83-32358
SATELLITE IMAGERY
Use of remote sensing techniques and the universal soil loss equation to determine soil erosion
[PB83-182006] N83-32172
SATELLITE LIFETIME
Space station needs, attributes and architectural options study review report
[NASA-CR-172947] N83-31714
SATELLITE OBSERVATION
Discussion of Halley's comet projects N83-31625
SATELLITE ORBITS
Satellite transmission of ODAS-451 data during July and August 1982
[PB83-183632] N83-32253
On computing instantaneous geocentric tides along satellite tracks, the NSWC STT program
[AD-A128568] N83-32264
SATELLITE TRACKING
An evaluation of SARP (search and rescue planning system) drift predictions using satellite-tracked drift-buoys
[AD-A127987] N83-31588
SATELLITE TRANSMISSION
Satellite transmission of ODAS-451 data during July and August 1982
[PB83-183632] N83-32253
SATELLITE-BORNE INSTRUMENTS
Development of advanced heating facility concepts for microgravity application N83-31653
SATURABLE REACTORS
Saturated tearing modes in Tokamaks with divertors
[DE83-005589] N83-32598
SATURN (PLANET)
Saturn as a radio source
[NASA-TM-85023] N83-32695
SCALE MODELS
Optical investigation of critical behavior in simple fluids at reduced gravity N83-31696
SCALING LAWS
Scaling laws for vortex induced debris ingestion into air intakes
[BAE-KRS-N-GEN-274] N83-31575
Effects of standard extremity on mixed standard scale performance ratings
[AD-A128645] N83-32310
Dynamic scaling of manipulator trajectories
[AD-A127074] N83-32313
SCATTERING CROSS SECTIONS
A PACER: A Monte Carlo time-dependent spectrum program for generating few-group diffusion-theory cross sections
[DE83-003779] N83-32351
Fast-neutron total and scattering cross sections of niobium
[DE83-002285] N83-32537
Production of high-transverse-energy events in p-nucleus collisions at 400 GeV/c
[DE83-002099] N83-32547
Psi prime photoproduction at a mean energy of 150 GeV
[DE83-000686] N83-32549
Coulomb dissociation in relativistic heavy-ion reactions
[DE83-005004] N83-32557
SCAVENGING
Interpretations of the OSCAR data for reactive-gas scavenging
[DE83-003597] N83-32195
SCHEDULING
Planning and scheduling enhancement in the aquisition process 2tt the Aeronautical Systems Div.
[AD-A128521] N83-32666

SCHMIDT TELESCOPES
Activities in astronomy
[ISBN-0-902553-23-2] N83-32692
SCHROEDINGER EQUATION
Quasiresonance of long life
[AD-A127763] N83-32442
SCIENCE
USSR report: Science and technology policy, no. 9
[JPRS-82713] N83-32647
Methods discussed for accelerating adoption of scientific achievements N83-32648
Better results from development of technical equipment N83-32649
Streamlining flow of scientific and technical information N83-32653
R&D acitivities of Belorussian SSR Academy of Sciences described N83-32654
SCREW DISLOCATIONS
X-ray topographic fractography of single crystals of molybdenum and niobium
[DE83-005066] N83-32642
SEA GRASSES
Evaluation of spatial, radiometric and spectral thematic mapper performance for coastal studies
[E83-10386] N83-32139
SEA ICE
Chemical fractionation of brine in the McMurdo Ice Shelf, Antarctica
[AD-A127821] N83-32262
K-band radiometric mapping of sea ice
[AD-A128205] N83-32268
SEALING
Large plate CdTe synthesis by sealed vessel transport
[AD-A127893] N83-32616
SEALS (STOPPERS)
Preliminary engineering study: Quick opening valve MSFC high Reynolds number wind tunnel
[NASA-CR-170845] N83-31612
High speed cryogenic self-acting, shaft seals for liquid rocket turbopumps
[NASA-CR-168194] N83-32070
SEARCHING
An evaluation of SARP (search and rescue planning system) drift predictions using satellite-tracked drift-buoys
[AD-A127967] N83-31588
A result on the computational complexity of heuristic estimates for the A algorithm
[AD-A127901] N83-32411
SEASAT SATELLITES
On computing instantaneous geocentric tides along satellite tracks, the NSWC STT program
[AD-A128568] N83-32264
SEATS
Design and test criteria for increased energy-absorbing seat effectiveness
[AD-A128015] N83-31589
SECONDARY FLOW
Translation nonequilibrium in a rapid expansion flow from a high temperature source N83-32498
SECURITY
Tonopah Test Range capabilities: Technical manual
[DE83-005362] N83-31709
SEDATIVES
Psychopharmacological techniques for optimizing human performances
[AD-A128529] N83-32309
SEDIMENT TRANSPORT
Metal input and mobilization in 2 acid-stressed lake watersheds in Maine
[PB83-182022] N83-32201
SEDIMENTARY ROCKS
Paleozoic geology of the New Madrid area
[DE83-900300] N83-32223
SEDIMENTS
Orientation study of northern Arkansas. National uranium resource evaluation program. Hydrogeochemical and steam-sediment reconnaissance
[DE83-001214] N83-32156
Hydrogeochemical and stream sediment reconnaissance, orientation study of central Louisiana: National uranium resource evaluation program
[DE83-001217] N83-32157
Effects of snow compaction on water release and sediment yield, Bridger Bowl Ski Area, Gallatin County, Montana
[PB83-186445] N83-32174
Geology and engineering characteristics of selected low-permeability gas sands: A survey
[PB83-195099] N83-32230
SEEDS
The water factor in harvest-sprouting of hard red spring wheat
[E83-10376] N83-32129
SEISMIC WAVES
The Shock and Vibration Digest, volume 15, no. 3
[AD-A126991] N83-32089
Deterministic methods of seismic source identification
[AD-A127477] N83-32211
Intraplate seismicity and seismic risk in the Atlantic Ocean based on teleseismically observed earthquakes
[IOS-136] N83-32227
Oceanic Pn/Sn phases: A qualitative explanation and reinterpretation of the T-phase
[AD-A128343] N83-32266
Annotated Tsunami bibliography: 1962-1976
[DE83-900003] N83-32270
SEISMOGRAMS
Synthetic seismogram modeling
[AD-A128305] N83-32218
SEISMOLOGY
Interactive graphics package for the MEGATEK 7250 terminal of the seismic analysis station at the Centre for Seismic Studies
[AD-A127866] N83-32210
Deterministic methods of seismic source identification
[AD-A127477] N83-32211
Seismographic networks: Problems and outlook for the 1980's
[AD-A128032] N83-32215
Earthquake Engineering Research, 1982: Overview and recommendations
[PB83-176024] N83-32228
SEMANTICS
A data base processor semantics specification package
[NASA-CR-172172] N83-32352
SEMICONDUCTOR DEVICES
Design philosophy for high-resolution rate and throughput spectroscopy systems
[DE83-004117] N83-31782
A singular perturbation approach for the analysis of the fundamental semiconductor equation
[AD-A127728] N83-32425
SEMICONDUCTOR LASERS
Optimized couplers between junction lasers and single-mode fibers
[AD-A128040] N83-32056
SEMICONDUCTORS (MATERIALS)
Experiments on crystallization of semiconductors aboard Salyut 6: Soyuz orbital complex N83-31688
The main results of the space material science experiments within the framework of Intercosmos program N83-31700
Semiconductor electrodes. Part 51: Efficient electroluminescence at ZnS electrode in aqueous electrolytes
[AD-A127454] N83-31966
GaP/Al-x/Ga-1-x/P heterojunction bipolar junction transistor for high-temperature electronic applications
[DE83-001267] N83-31977
Cross-sectional transmission electron microscopy of semiconductors
[DE83-003682] N83-32627
Ga(As,P) strained-layer super-lattices: A ternary semiconductor with independently adjustable band gap and lattice constant
[DE83-003917] N83-32634
SENSITIVITY
Halogen Occultation Experiment (HALOE) gas cell life test program
[NASA-TM-84640] N83-32028
SEPARATORS
Advanced inorganic separators for alkaline batteries and method of making the same
[NASA-CASE-LEW-13171-2] N83-32176
Atomic-vapor-laser isotope separation
[DE83-003253] N83-32530
SEQUENTIAL ANALYSIS
The asymptotic variance of higher order crossings
[AD-A127459] N83-32430
Algebraic approximation of event tree sequences
[DE82-022169] N83-32452
SERIES EXPANSION
Comparison of algorithms for computing generating-system reliability indexes
[DE83-901863] N83-32079
SERVICE LIFE
Service life evaluation of rigid explosive transfer lines
[NASA-TP-2143] N83-31596
Some generalizations of the renewal process
[AD-A127522] N83-32431
SET THEORY
On subset selection procedures for the largest mean from normal populations having a common known coefficient of variation
[AD-A127136] N83-32461
SHADOWS
Binocular shading and visual surface reconstruction
[AD-A127058] N83-32580
SHAFTS (MACHINE ELEMENTS)
High speed cryogenic self-acting, shaft seals for liquid rocket turbopumps
[NASA-CR-168194] N83-32070
SHAPED CHARGES
Flight termination system equipment. Volume 4: Safing and arming devices, initiators, and shaped charges
[AD-A127480] N83-31707
Preliminary investigation of aluminum combustion in air and steam
[AD-A128566] N83-31757
SHAPES
Binocular shading and visual surface reconstruction
[AD-A127058] N83-32580
SHEAR LAYERS
Experimental observations of shear patterns in direct shear tests
[PB83-187351] N83-31917
SHEAR PROPERTIES
Tests of subgrid-scale models in strained turbulence. Studies of the structure of homogeneous shear flows: Developing a model of turbulence near a wall from solutions of the Navier-Stokes equation
[AD-A128282] N83-32004
SHEAR STRESS
Couette flow in continuum to free molecular regime N83-32493
Studies on condensation heat transfer in two-phase closed thermosyphons N83-32505
SHELLS (STRUCTURAL FORMS)
Calculation of the shielding effect of solid shell enclosures
[AWRE-O18/82] N83-31920
Simplified analysis of shells with local, impulsive loads
[DE83-003791] N83-32119
SHIELDING
Extractive distillation of nitric acid using the two-pot concept
[DE83-004176] N83-31777
SHOCK LOADS
Shock compression of single-crystal forsterite N83-32614
SHOCK WAVE INTERACTION
Theoretical investigation of three-dimensional shock wave-turbulent boundary layer interactions
[AD-A127118] N83-31999
SHOCK WAVES
Jurist comments on legal questions regarding US shuttle N83-31631
Densification kinetics of shock-activated nitrides
[DE83-003008] N83-31742
Blast wave decay from an exploding hemispherical gas cloud
[PB83-177857] N83-32025
Frequency effect of transonic flow over an oscillating airfoil N83-32486
SHORT TAKEOFF AIRCRAFT
Flight directors for STOI aircraft
[NASA-CR-166517] N83-31590
Aerodynamic ejectors in the UK
[BAE-KRS-N-GEN-243] N83-31594
SHUTDOWNS
Heat transfer to water from a vertical tube bundle under natural-circulation conditions
[DE83-008459] N83-32010
SIEVES
Absorption of ethanol and water vapor by Silicalite, a hydrophobic molecular sieve
[DE83-004981] N83-31788
SIGNAL ANALYZERS
Hardware and software implementation of an interface between the Unibus and the General Purpose Interface Bus
[AD-A127564] N83-32377
SIGNAL DETECTION
Effect of test result uncertainty on the performance of a context-free troubleshooting task
[AD-A128584] N83-31573
Evaluating the detectability of Gaussian stochastic signals by steepest-descent integration
[AD-A127604] N83-32419
SIGNAL DETECTORS
Evaluating the detectability of Gaussian stochastic signals by steepest-descent integration
[AD-A127604] N83-32419
SIGNAL ENCODING
A hardware preprocessor for use in speech recognition: Speech Input Device SID3
[NPL-DITC-22/83] N83-31923
SIGNAL FADING
Third-harmonic generation for photoionization studies
[DE83-001960] N83-32544
SIGNAL GENERATORS
Adaptive reference voltage generator for firing angle control of line-commutated inverters
[NASA-CASE-MFS-25215-1] N83-31953

Failure detection with uncertain models
[NASA-CR-172835] N83-32417

SIGNAL PROCESSING
Design philosophy for high-resolution rate and throughput spectroscopy systems
[DE83-004117] N83-31782
Multifunction spread spectrum technology
[AD-A127045] N83-31929
A post-processing algorithm for time domain pitch trackers
[AD-A127671] N83-31934
Clutter processing of SEEK IGLOO: A modern long range 3-D radar
[AD-A127520] N83-31937
Deconvolution of noisy transient signals: A Kalman filtering application
[DE83-030849] N83-31950
Research in VLSI systems. Heuristic programming project and VLSI theory project: A fast turn around facility for Very Large Scale Integration (VLSI)
[AD-A127153] N83-31961
Design and implementation of multi-input adaptive signal extractions
[AD-A127038] N83-31963
Low cost harmonic analyser for the distribution network
[PB83-184697] N83-31992
Impulse response of the ocean floor nonlinear techniques for measurement enhancement
[AD-A128578] N83-32269
Optimum multisensor, multitarget time delay estimation
[AD-A127639] N83-32423
Estimation of a filtered marked Poisson process from noisy observations with applications to signal processing
[AD-A127692] N83-32466
Interferometric angle monitor
[NASA-CASE-GSC-12614-1] N83-32577
Evaluation of infrared target discrimination algorithms
[AD-A128283] N83-32587

SIGNAL REFLECTION
Cylindrical Bessel functions for a large range of complex arguments
[AD-A128049] N83-32428
The effect on the measurement of aircraft noise of reflections from the ground
[NPL-AC-102] N83-32517

SIGNAL TO NOISE RATIOS
Deconvolution of noisy transient signals: A Kalman filtering application
[DE83-030849] N83-31950
Iterative noise elimination preliminary report
[AD-A127756] N83-32519

SIGNAL TRANSMISSION
Environmental standards for electro-optical systems
[AD-A127776] N83-32588

SIGNATURES
Modern signature analysis
[AD-A127993] N83-31939

SILICATES
Absorption of ethanol and water vapor by Silicalite, a hydrophobic molecular sieve
[DE83-004981] N83-31788
Effects of irradiation on ceramics for fusion-reactor applications
[DE83-009468] N83-31872

SILICON
Motive forces of structural changes in ferrosilicon during heating after slight deformations
[BLL-M-35039-(5828.4)] N83-31799
Calculation of phase equilibrium of Si-O-C system in polynomial form: Communication 1
[BLL-M-34980-(5828.4)] N83-31817
A study of the uranium-aluminum-silicon system
[DE83-002345] N83-31836

SILICON COMPOUNDS
Silicon-slurry/aluminide coating --- protecting gas turbine engine vanes and blades
[NASA-CASE-13343-2] N83-31795

SILICON NITRIDES
Structural reliability of yttria-doped, hot-pressed silicon nitride at elevated temperatures
[AD-A127583] N83-31862
Analysis of oxide and oxide/matrix interfaces in silicon nitride
[PB83-178699] N83-31883
Fracture of hot-pressed silicon nitride at elevated temperatures
[DE83-005236] N83-32117

SIMPLEX METHOD
Solution of systems of complex linear equations in the L infinity norm with constraints on the unknowns
[AD-A127883] N83-32410

SIMULATION
Investigation of convective flows in model systems of directional solidification configurations N83-31682
Research on hot cracking in weld metal by melting-solidification heat cycle simulator
[PB83-178921] N83-32075

SIMULATORS
Digital communications in spatially distributed interference channels
[AD-A127741] N83-31943
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 8: Fault simulation
[AD-A128019] N83-31971

SINGLE CRYSTALS
Composition and electrical property relationships in polycrystalline inorganic materials
[AD-A127458] N83-31750
Spectroscopic properties of the f-elements in compounds and solutions
[DE83-007963] N83-31759
Magnetic susceptibility of scandium-hydrogen and lutetium-hydrogen solid-solution alloys from 2 to 300 deg K
[DE83-004786] N83-31846
Shock compression of single-crystal forsterite N83-32614
Observation of a first-order phase transition in single-crystal ErRh-4B4 at Hc-2
[DE83-008609] N83-32623
X-ray topographic fractography of single crystals of molybdenum and niobium
[DE83-005066] N83-32642

SINGULARITY (MATHEMATICS)
Annals of the Fourier Institute, volume 33, number 1
[ISSN-0373-0956] N83-32329
The germs of diffeomorphisms and of vector fields in the class of finite differentiability N83-32338
Fiber cobordism and approximation of a singular submanifold by C(infinity) N83-32340

SINTERING
An analysis of the driving forces in liquid phase sintering N83-31691
Densification kinetics of shock-activated nitrides
[DE83-003008] N83-31742
Fireproof ceramics and process for their manufacture
[DE83-005021] N83-31881

SITE SELECTION
Relationship of an in-situ test facility to a deep geologic repository for high-level nuclear waste, task 4
[DE83-901818] N83-31726
Geotechnical instrumentation requirements for at-depth testing and repository monitoring in tuff
[DE83-002188] N83-32034
Review and evaluation of paleohydrologic methodologies
[DE83-004572] N83-32159
Nuclear-waste disposal: Technical issues and status
[DE83-002185] N83-32568

SKEWNESS
Self-reflecting skew polygons and polytopes in the 4-dimensional hypercube
[AD-A127762] N83-32443

SKIN (ANATOMY)
A model of heat loss and thermoregulation for immersion in cold water
[AD-A127854] N83-32300

SKIN (STRUCTURAL MEMBER)
Skin technology: Fundamentals and applications --- in space processing N83-31693

SKY BRIGHTNESS
Cloud cover sensor
[NASA-CASE-NPO-14936-1] N83-32232
Final Tactical Decision Aid (FTDA) for infrared (8-12 micrometers) systems, manual version. Appendix B: Insolation and sky radiation tables
[AD-A127853] N83-32699

SLABS
Melt fingers and pool penetration into a miscible substrate --- for application to the design of post-accident core retention systems for nuclear reactors
[DE83-004511] N83-31768

SLEEP
Sleep deprivation and performance: The optimum use of limited sleep periods
[AD-A126934] N83-32291
Psychopharmacological techniques for optimizing human performances
[AD-A128529] N83-32309

SLEEP DEPRIVATION
Sleep deprivation and performance: The optimum use of limited sleep periods
[AD-A126934] N83-32291

SLOPES
Global analysis of the shallow geology of large-scale ocean slopes
[AD-A128208] N83-32267

SLURRIES
Silicon-slurry/aluminide coating --- protecting gas turbine engine vanes and blades
[NASA-CASE-13343-2] N83-31795
Prediction of pressure drop of two-phase coal slurries in pipelines
[DE83-003382] N83-32016

SMOKE
IR and visible wavelength obscuration by pyrotechnically generated alkali-halide smokes
[AD-A127616] N83-32581

SNOW
LANDSAT-D investigations in snow hydrology --- Sierra Nevada Mountains, California
[E83-10388] N83-32141
Snow reflectance from thematic mapper
[E83-10391] N83-32144
Effects of snow compaction on water release and sediment yield, Bridger Bowl Ski Area, Gallatin County, Montana
[PB83-186445] N83-32174

SNOW COVER
LANDSAT-D investigations in snow hydrology --- Sierra Nevada Mountains
[E83-10382] N83-32135

SOCIAL FACTORS
Women at sea: Welcome aboard
[AD-A128602] N83-32646

SODIUM FLUORIDES
Electroplating of refractory metals and alloys from fluoride melt
[AD-A127116] N83-31819

SOFTWARE TOOLS
Wellborne inertial navigation system
[DE83-004012] N83-31593
A data base processor semantics specification package
[NASA-CR-172172] N83-32352
Recommended approach to sofware development
[NASA-TM-85396] N83-32355
Proceedings of the Seventh Annual Software Engineering Workshop
[NASA-TM-85400] N83-32356
What have we learned in the past 6 years? Measuring software development technology N83-32357
User interface design of software tool system as a technology transfer vehicle N83-32362
Software Engineering Laboratory (SEL). Data base organization and user's guide, revision 1
[NASA-TM-85397] N83-32369
Configuration Analysis Tool (CAT). System Description and users guide (revision 1)
[NASA-TM-85398] N83-32370

SOIL MECHANICS
Use of acoustic emissions to predict ground stability
[PB83-178764] N83-31911
Tension cutoff and parameter identification for the viscoplastic cap model
[AD-A128304] N83-32217

SOIL MOISTURE
Mechanisms, distribution and frequency of groundwater recharge in upland areas of western North Dakota
[PB83-182121] N83-32168

SOILS
Application of a third-invariant plasticity theory to concrete and soils
[AD-A127079] N83-32097
Use of remote sensing techniques and the universal soil loss equation to determine soil erosion
[PB83-182006] N83-32172

SOLAR ACTIVITY
Variation of equatorial F-region irregularity parameters as a function of solar activity
[AD-A127895] N83-32209
A quantitative study of magnetic flux transport on the Sun
[AD-A127122] N83-32697
Joint solar dynamics project data summary. Volume 1: Chromospheric and coronal observations
[PB83-175638] N83-32702

SOLAR ATMOSPHERE
Joint solar dynamics project data summary. Volume 1: Chromospheric and coronal observations
[PB83-175638] N83-32702

SOLAR CELLS
Development and testing of a submersible motor pump driven by a solar cell generator
[BMFT-FB-T-83-081] N33-32074
High voltage v-groove solar cell
[NASA-CASE-LEW-13401-2] N83-32177
Schottky and MIS type amorphous-silicon solar cells
[BMFT-FB-T-83-043] N83-32184

SOLAR CORONA
Comparison of heliospheric current sheet structure obtained from potential magnetic field computations and from observed polarization coronal brightness
[NASA-CR-172832] N83-32700
Joint solar dynamics project data summary. Volume 1: Chromospheric and coronal observations
[PB83-175636] N83-32702

SOLAR CORPUSCULAR RADIATION
Alfven waves in the solar wind in association with solar energetic particles: Sunspot umbral origin
[AD-A128046] N83-32701

SOLAR ENERGY
Department of Energy Civilian Research and Development Authorization Act for fiscal year 1984
[H-REPT-98-81] N83-32683

SOLAR ENERGY CONVERSION
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984
[S-REPT-98-152] N83-32678
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-32680

SOLAR FLARES
Alfven waves in the solar wind in association with solar energetic particles: Sunspot umbral origin
[AD-A128046] N83-32701

SOLAR FURNACES
Hydrogen and oxygen from water. Part 6: Quenching the effluent from a solar furnace
[AD-A127457] N83-32182

SOLAR HEATING
Hydrogen and oxygen from water. Part 6: Quenching the effluent from a solar furnace
[AD-A127457] N83-32182

SOLAR MAGNETIC FIELD
Comparison of heliospheric current sheet structure obtained from potential magnetic field computations and from observed polarization coronal brightness
[NASA-CR-172832] N83-32700

SOLAR NEUTRINOS
Report on solar-neutrino experiments
[DE83-001306] N83-32543

SOLAR RADIATION
Final Tactical Decision Aid (FTDA) for infrared (8-12 micrometers) systems, manual version. Appendix B: Insolation and sky radiation tables
[AD-A127853] N83-32699

SOLAR SENSORS
Cloud cover sensor
[NASA-CASE-NPO-14936-1] N83-32232

SOLAR SIMULATORS
Solar-simulator-pumped atomic iodine laser kinetics
[NASA-TP-2182] N83-32044

SOLAR TERRESTRIAL INTERACTIONS
Self-study manual on optical radiation measurements. Part 3. Applications, chapter 1. Measurement of solar terrestrial spectral irradiance in the ozone cut-off region
[PB83-184382] N83-32231

SOLAR WIND
Comparison of heliospheric current sheet structure obtained from potential magnetic field computations and from observed polarization coronal brightness
[NASA-CR-172832] N83-32700
Alfven waves in the solar wind in association with solar energetic particles: Sunspot umbral origin
[AD-A128046] N83-32701

SOLDERING
Soldering under microgravity N83-31690

SOLENOIDS
The NMR (Nuclear Magnetic Resonance) sensor for calibrating the field of a superconducting solenoid
[AD-A127997] N83-31973

SOLID PROPELLANT COMBUSTION
Monochromatic high-speed photography of solid rocket propellant combustion
[AD-A127874] N83-31747

SOLID PROPELLANT ROCKET ENGINES
Holographic investigation of solid propellant combustion particulates
[AD-A127841] N83-32029

SOLID PROPELLANTS
Holographic investigation of solid propellant combustion particulates
[AD-A127841] N83-32029

SOLID ROCKET PROPELLANTS
Combustion dynamics in rockets
[AD-A127129] N83-31721
Monochromatic high-speed photography of solid rocket propellant combustion
[AD-A127874] N83-31747
Polycyclic high energy oxidizers
[AD-A128309] N83-31869

SOLID STATE
Holographic methods for the investigation of photophysical properties
[AD-A128510] N83-32032

SOLID STATE DEVICES
A 500-watt solid-state RF power amplifier AM-7209( )/VRC
[AD-A127462] N83-31965
The 4th Symposium on Applied Surface Analysis: Parts 1 and 2
[AD-A127109] N83-32615

SOLID SURFACES
Theory of collision-induced ionization of adsorbed species on solid surfaces in the presence of laser radiation
[AD-A128317] N83-32059

SOLID WASTES
Survey of foreign systems for incineration and energy recovery
[AD-A127461] N83-32181

SOLIDIFICATION
Implications of the lack of wetting at the monotectic growth front — in space N83-31680
Convection-Marangoni effects in solidification-microgravity N83-31681
Solidification of PbSn alloys under microgravity conditions N83-31701
Directed solidification of 40KKhNM alloy as a further means of improving the torques of small winding springs
[BLL-M-34969-(5828.4)] N83-31814
Analysis and calculation of macrosegregation in a casting ingot, exhibit D
[NASA-CR-170846] N83-31818
Advanced aluminum-lithium base alloys produced by rapid solidification from the melt
[AD-A127571] N83-31822
Rapid solidification studies of Ni3Al alloys
[DE83-004648] N83-31838
Research on hot cracking in weld metal by melting-solidification heat cycle simulator
[PB83-178921] N83-32075

SOLIDS
WATEQ3 geochemical model: Thermodynamic data for several additional solids
[DE83-000896] N83-32155

SOLITARY WAVES
A variational approach to surface solitary waves
[AD-A127707] N83-32000

SOLUBILITY
Low-gravity experiments on Liquid Phase Miscibility Gap (LPMG) alloys: Materials Experiments Assembly (MEA) N83-31685
Melt fingers and pool penetration into a miscible substrate — for application to the design of post-accident core retention systems for nuclear reactors
[DE83-004511] N83-31768
Solubilities of actinide solids under oxic conditions
[DE83-002675] N83-31776

SOLUTES
LDEF experiments: Crystal growth by a solute diffusion process N83-31664
Order of magnitude analysis of solute macrosegregation in crystal growth from the melt N83-31683

SOLUTIONS
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A127765] N83-31755

SOLVENT EXTRACTION
Identification and cleavage of breakable single bonds by selecting oxidation, reduction and hydrolysis
[DE83-005312] N83-32624

SOOT
A study of factors affecting soot formation in a swirl-stabilized combustor
[AD-A128255] N83-31754
Health effects of combustion-generated soot and polycyclic aromatic hydrocarbons: Human cell studies
[DE83-004578] N83-32196

SORET COEFFICIENT
Stationary and oscillatory instabilities for mixture subjected to Soret effect in vertical cylinder with axial temperature gradient N83-31661

SORPTION
Low-pressure transfer operations
[DE83-003443] N83-32011

SOUND FIELDS
Three-dimensional parabolic-equation-based estimation of the ocean acoustic field
[AD-A128507] N83-32520

SOUND PRESSURE
Bubble motion under reduced gravity N83-31644

SOUND TRANSDUCERS
Acoustic system for material transport
[NASA-CASE-NPO-15453-1] N83-32515

SOUND WAVES
Acoustic and gravity waves in the neutral atmosphere and the ionosphere, generated by severe storms
[NASA-CR-170834] N83-32205

SOUNDING ROCKETS
Soldering under microgravity N83-31690
Attitude control experiment of sounding rocket S-520-5 N83-32491

SOURCE PROGRAMS
Estimates of software size from state machine designs N83-32368

SOYBEANS
Comparison of CRD, APU, and state models for Iowa corn and soybeans and North Dakota barley and spring wheat
[E83-10379] N83-32132

SOYUZ SPACECRAFT
USSR report: Space, no. 23
[JPRS-83994] N83-31617
Commentary on Soyuz T-8 rendezvous failure N83-31619
Rendezvous in space N83-31629

SPACE CHARGE
Use of nitrogen laser for observation of space-charge effects in drift chambers
[DE83-004416] N83-32065

SPACE COMMUNICATION
Flight control center's history, functions spotlighted N83-31626
Space station needs, attributes and architectural options study commercialization working group briefing
[NASA-CR-172948] N83-31715
Research in space commercialization, technology transfer, and communications, volume 2
[NASA-CR-172955] N83-32657

SPACE DEBRIS
Preliminary design of an Earth-based debris detection system using current technology and existing installations
[NASA-CR-171680] N83-31705

SPACE EXPLORATION
Oversight of the UNISPACE Conference
[GPO-14-255] N83-31633

SPACE FLIGHT
Proceedings of the Symposium on Mechanics for Space Flight
[ISAS-SP-1] N83-32480

SPACE FLIGHT TRAINING
Star City astronaut training center N83-31622
Cosmonaut training simulators at Zvezdnyy Gorodok described N83-31623

SPACE HEATING (BUILDINGS)
Technology for energy-efficient buildings
[DE83-005927] N83-31905
Convective heat transfer in buildings: Recent research results
[DE83-015706] N83-32017

SPACE INDUSTRIALIZATION
Manufacturing in space: Fluid dynamics numerical analysis
[NASA-CR-172944] N83-31996
Research in space commercialization, technology transfer, and communications, volume 2
[NASA-CR-172955] N83-32657

SPACE LAW
Jurist comments on legal questions regarding US shuttle N83-31631

SPACE MANUFACTURING
Oversight of the UNISPACE Conference
[GPO-14-255] N83-31633
Japanese program review of material processing in space N83-31640
Precipitation of gas pores in metallic metals during cooling under microgravity N83-31648
Sounding-rocket flight test of an acoustic mixer by manufacture of a lead-zinc emulsion alloy in microgravity N83-31652
Space station needs, attributes and architectural options study commercialization working group briefing
[NASA-CR-172948] N83-31715

SPACE MECHANICS
On the interpolation formula based upon the asymptotic solution to the kinetic model equation N83-32495

SPACE OBSERVATIONS (FROM EARTH)
Discussion of Halley's comet projects N83-31625

SPACE PLATFORMS
Development of deployable structures for large space platform systems. Volume 1: Executive summary
[NASA-CR-170838] N83-31632

SPACE POWER REACTORS
Conceptual designs for 100-MW space radiators
[DE83-003542] N83-32020

SPACE PROCESSING
Ryumin interviewed on Salyut experiments N83-31621

Materials Sciences Under Microgravity --- conferences [ESA-SP-191] N83-31637
Implications of the lack of wetting at the monotectic growth front --- in space N83-31680
Low-gravity experiments on Liquid Phase Miscibility Gap (LPMG) alloys: Materials Experiments Assembly (MEA) N83-31685
Skin technology: Fundamentals and applications --- in space processing N83-31693
The main results of the space material science experiments within the framework of Intercosmos program N83-31700
Solidification of PbSn alloys under microgravity conditions N83-31701

SPACE PROGRAMS
Space research in Norway [SAD-102-T] N83-32689

SPACE SHUTTLE MAIN ENGINE
Evaluation of outer race tilt and lubrication on ball wear and SSME bearing life reductions [NASA-CR-170836] N83-32069

SPACE SHUTTLE ORBITERS
Pressure distributions obtained on a 0.04-scale and 0.02-scale model of the Space Shuttle Orbiter's forward fuselage in the Langley 20-inch Mach 6 air tunnel [NASA-TM-84629] N83-31636
Analysis of gap heating due to stepped tiles in the shuttle thermal protection system [NASA-TP-2209] N83-31713

SPACE SHUTTLES
Jurist comments on legal questions regarding US shuttle N83-31631
Space Transportation System Mission STS-7 [NASA-TM-85337] N83-31711
Space station needs, attributes and architecture options study technology development working group briefing [NASA-CR-172949] N83-31716
Space transportation system biomedical operations support study [NASA-CR-166834] N83-32286

SPACE STATIONS
Definition of satellite servicing technology development missions for early space stations. Volume 2: Technical [NASA-CR-170844] N83-31634
Definition of satellite servicing technology development missions for early space stations [NASA-CR-170843] N83-31635
Space station needs, attributes and architectural options study review report [NASA-CR-172947] N83-31714
Space station needs, attributes and architectural options study commercialization working group briefing [NASA-CR-172948] N83-31715
Space station needs, attributes and architecture options study technology development working group briefing [NASA-CR-172949] N83-31716
Space station needs, attributes and architectural options study mission requirement working group briefing [NASA-CR-172951] N83-31718
Space station needs, attributes and architectural options study system working group briefing [NASA-CR-172952] N83-31719

SPACE SUITS
Star City astronaut training center N83-31622
Space station needs, attributes and architecture options study technology development working group briefing [NASA-CR-172949] N83-31716

SPACE TRANSPORTATION
Policy and organization: The next step in the National Space Program [AD-A127012] N83-31704

SPACE TRANSPORTATION SYSTEM
Space station needs, attributes and architectural options study review report [NASA-CR-172947] N83-31714
Space station needs, attributes and architectural options study commercialization working group briefing [NASA-CR-172948] N83-31715
Space station needs, attributes and architectural options study system working group briefing [NASA-CR-172952] N83-31719
Space transportation system biomedical operations support study [NASA-CR-166834] N83-32286
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 [S-REPT-98-152] N83-32678
National Aeronautics and Space Administration research and development N83-32679
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-32680
Space flight, control and data communications N83-32681

SPACE TRANSPORTATION SYSTEM FLIGHTS
Space station needs, attributes and architectural options study costing working group briefing [NASA-CR-172950] N83-31717

SPACE TRANSPORTATION SYSTEM 3 FLIGHT
Materials investigation of STS-3 parachute failure [NASA-TM-82540] N83-31712

SPACE TRANSPORTATION SYSTEM 7 FLIGHT
Particle transport induced by directional solidification --- STS 7 N83-31642
The behavior of a metallic dispersion under microgravity conditions N83-31647
Space Transportation System Mission STS-7 [NASA-TM-85337] N83-31711

SPACEBORNE EXPERIMENTS
USSR report: Space, no. 23 [JPRS-83994] N83-31617
Fluid physics under reduced gravity: An overview --- Spacelab experiments N83-31638
The behavior of a metallic dispersion under microgravity conditions N83-31647
Scientific goals of the D1-mission --- Spacelab experiment N83-31650
The fluid physics module: New possibilities and applications --- Spacelab payloads N83-31651
Technical implications of a flight experiment design --- for microgravity experiments N83-31657
Isothermal gradient heat-pipes space furnace (500 to 1000 deg C) N83-31659
Reconstruction by multidirectional holographic interferometry of the concentration field in a supersaturated solution near a growing NaClO3 crystal N83-31660
LDEF experiments: Crystal growth by a solute diffusion process N83-31664
Fundamental combustion experiments in microgravity N83-31666
Studies of experiments on droplet burning at reduced gravity N83-31667
Low-gravity experiments on Liquid Phase Miscibility Gap (LPMG) alloys: Materials Experiments Assembly (MEA) N83-31685
Experiments on crystallization of semiconductors aboard Salyut 6: Soyuz orbital complex N83-31688
Adhesion of metals experiment simulation and ground-based reference test results N83-31692
The main results of the space material science experiments within the framework of Intercosmos program N83-31700

SPACEBORNE PHOTOGRAPHY
Salyut-7 passes one year in orbit mark N83-31620
Space survey techniques benefit geology N83-31630

SPACEBORNE TELESCOPES
Commentary on Astron satellite N83-31624
National Aeronautics and Space Administration research and development N83-32679

SPACECRAFT COMMUNICATION
Customer premises services market demand assessment 1980 - 2000. Volume 1: Executive summary [NASA-CR-168150] N83-31925

SPACECRAFT CONSTRUCTION MATERIALS
Fixture for environmental exposure of structural materials under compression load [NASA-CASE-LAR-12602-1] N83-32081

SPACECRAFT DESIGN
Space station needs, attributes and architectural options study system working group briefing [NASA-CR-172952] N83-31719

SPACECRAFT DOCKING
Commentary on Soyuz T-8 rendezvous failure N83-31619
Development of deployable structures for large space platform systems. Volume 1: Executive summary [NASA-CR-170838] N83-31632

SPACECRAFT DOCKING MODULES
Zaytsev comments on modular orbital stations N83-31618

SPACECRAFT ELECTRONIC EQUIPMENT
Cosmic ray effects on microelectronics. Part 2: The geomagnetic cutoff effects [AD-A128601] N83-32703

SPACECRAFT INSTRUMENTS
Vibration isolation and pressure compensation apparatus for sensitive instrumentation [NASA-CASE-LAR-12728-1] N83-32026

SPACECRAFT ORBITS
Space station needs, attributes and architectural options study mission requirement working group briefing [NASA-CR-172951] N83-31718

SPACECRAFT STRUCTURES
Commentary on Astron satellite N83-31624
Structures and Dynamics Division: Research and technology plans for FY 1983 and accomplishments for FY 1982 [NASA-TM-85661] N83-32095
Thermal-structural analysis of large space structures: A review of recent advances [AD-A128016] N83-32107

SPACECRAFT TRAJECTORIES
Optimization of low thrust trajectories for collinear Lagrange point mission N83-32490

SPACELAB
Japanese program review of material processing in space N83-31640

SPACELAB PAYLOADS
Fluid physics under reduced gravity: An overview --- Spacelab experiments N83-31638
Ostwald ripening and solidification behavior of near monotectic ZN-PB alloys N83-31646
Scientific goals of the D1-mission --- Spacelab experiment N83-31650
The fluid physics module: New possibilities and applications --- Spacelab payloads N83-31651
An automatic monoellipsoidal mirror furnace facility for long-term crystal growth on the European Retrievable Carrier (EURECA) N83-31655
Adhesion of metals experiment simulation and ground-based reference test results N83-31692
Optical investigation of critical behavior in simple fluids at reduced gravity N83-31696

SPARE PARTS
POM (Program Objective Memorandum) FY-85 BP 1500 cost growth and leadtime adjustments: Research results [AD-A128522] N83-32667

SPARK GAPS
Use of nitrogen laser for observation of space-charge effects in drift chambers [DE83-004416] N83-32065

SPARK IGNITION
Turbulent combustion rate in a spark ignition engine: Some comparisons between model predictions and experiments [DE83-003205] N83-31767
Electric spark sensitivity profile of explosible/combustible systems [PB83-177865] N83-31792
Oxyhydrogen ignition and flame propagation under cryogenic temperatures N83-32484

SPATIAL DISTRIBUTION
Electric spark sensitivity profile of explosible/combustible systems [PB83-177865] N83-31792
Preliminary statistical studies concerning the Campos RJ sugar cane area, using LANDSAT imagery and aerial photographs [E83-10384] N83-32137
Variability of precipitation in the Pacific Northwest: Spatial and temporal characteristics [PB83-175232] N83-32249
Enhancing perceptibility of barely perceptible targets [AD-A127589] N83-32582

SPATIAL RESOLUTION
Simulation of meteorological satellite (METSAT) data using LANDSAT data [E83-10381] N83-32134
LANDSAT-D investigations in snow hydrology --- Sierra Nevada Mountains [E83-10382] N83-32135
Evaluation of spatial, radiometric and spectral thematic mapper performance for coastal studies [E83-10386] N83-32139
Geologic exploration: The contribution of LANDSAT-4 thematic mapper data [E83-10387] N83-32140
LANDSAT-D investigations in snow hydrology --- Sierra Nevada Mountains, California [E83-10388] N83-32141

SPECIMEN GEOMETRY
Reconstituted Charpy impact specimens [DE83-901113] N83-32113

SPECTRA
Estimation of wave spectra from wave height and period [IOS-135] N83-32271

SPECTRAL BANDS
A preliminary evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies [E83-10383] N83-32136
Investigation of several aspects of LANDSAT-4 data quality [E83-10390] N83-32143
Snow reflectance from thematic mapper [E83-10391] N83-32144
Comparison of modelled and empirical atmospheric propagation data [E83-10398] N83-32146

SPECTRAL REFLECTANCE
Snow reflectance from thematic mapper [E83-10391] N83-32144

SPECTRAL RESOLUTION
Evaluation of spatial, radiometric and spectral thematic mapper performance for coastal studies
[E83-10386] N83-32139
Geologic exploration: The contribution of LANDSAT-4 thematic mapper data
[E83-10387] N83-32140
Impact of LANDSAT MSS sensor differences on change detection analysis
[E83-10395] N83-32145
SPECTRAL SIGNATURES
LANDSAT data preprocessing
[E83-10380] N83-32133
Simulation of meteorological satellite (METSAT) data using LANDSAT data
[E83-10381] N83-32134
SPECTROMETERS
Photoelectron spectrometer for high-resolution angular resolved studies
[DE83-008687] N83-32033
Charge correlations in deep inelastic proton-proton interactions at the CERN ISR: The axial field spectrometer collaboration
[DE83-002324] N83-32539
SPECTROSCOPIC ANALYSIS
Physical basis for prompt-neutron activation analysis
[DE83-003938] N83-32559
SPECTROSCOPY
Suitability of a wall-stabilized arc as a transfer standard of spectral radiance in the spectral range 165 to 350 nm
[NPL-QU-65] N83-32479
SPECTRUM ANALYSIS
Halogen Occultation Experiment (HALOE) gas cell life test program
[NASA-TM-84640] N83-32028
SPEECH RECOGNITION
A theoretical model for the Speech Input Device SID3. Part 1: Filters
[NPL-DITC-20/83-PT-1] N83-31921
A theoretical model for the Speech Input Device SMD3. Part 2: Correlators
[NPL-DITC-21/83-PT-2] N83-31922
A hardware preprocessor for use in speech recognition: Speech Input Device SID3
[NPL-DITC-22/83] N83-31923
Controlled test procedures for using intervocalic consonauts to assess speech intelligibility: A feasibility study
[AD-A127953] N83-31941
Some effects of stress on users of a voice recognition system: A preliminary inquiry
[AD-A128559] N83-31944
A preliminary analysis of human factors affecting the recognition accuracy of a discrete word recognizer for C3 systems
[AD-A128546] N83-31946
SPENT FUELS
Assessment of spent-fuel waste-form/stabilizer alternatives for geologic disposal
[DE83-002458] N83-32573
SPHERES
Zaytsev comments on modular orbital stations N83-31618
Elastic fields under a spherical indenter
[AD-A127732] N83-32103
Significance points for some tests of uniformity on the sphere, revision
[AD-A128027] N83-32435
SPHERICAL SHELLS
Simplified methods for the inelastic analysis and reliability assessment of stiffened shells — for nuclear power plant containment vessels
[DE83-004966] N83-32100
SPIN-LATTICE RELAXATION
Magnetic-resonance studies of reactively sputtered amorphous silicon-hydrogen alloys
[DE83-004958] N83-31842
Why QCD lattice theory is important to spin physicists
[DE83-003955] N83-32638
SPIN-ORBIT INTERACTIONS
Electronic structure of hcp lutetium
[DE83-004866] N83-32643
SPLICING
Equipment qualification research test of electrical cable with factor splices and insulation rework: Test no. 2, report no. 1
[DE83-002165] N83-31980
SPLINE FUNCTIONS
Bivariate cardinal interpolation by splines on a three-direction mesh
[AD-A127939] N83-32412
On collocation schemes for quasilinear singularity perturbed boundary value problems
[AD-A127727] N83-32426
Bayesian models for response surfaces of uncertain functional form
[AD-A127703] N83-32465
SPRAYED COATINGS
Thermal barrier coating system having improved adhesion
[NASA-CASE-LEW-1335901] N83-31855
SPREAD SPECTRUM TRANSMISSION
Multifunction spread spectrum technology
[AD-A127045] N83-31929
SPRINGS (ELASTIC)
Directed solidification of 40KKhNM alloy as a further means of improving the torques of small winding springs
[BLL-M-34969-(5828.4)] N83-31814
SQUID (DETECTORS)
Fundamental limits on SQUID technology
[DE83-002561] N83-32629
STABILITY
Use of acoustic emissions to predict ground stability
[PB83-178764] N83-31911
A modification to a flashlamp-pumped dye laser to increase stability of the spatial mode
[AD-A128037] N83-32057
Stable viscosity matrices for systems of conservation laws
[AD-A127759] N83-32447
STABILITY AUGMENTATION
Development of the MICROSAS longitudinal flight control system for the augmentor wing aircraft
[AD-A128331] N83-31608
STABILIZATION
Image motion compensation by area correlation and centroid tracking of solar surface features
[NASA-TM-82538] N83-32690
STABILIZED PLATFORMS
Attitude control experiment of sounding rocket S-520-5 N83-32491
STABILIZERS (FLUID DYNAMICS)
Advanced composite vertical stabilizer for DC-10 transport aircraft
[NASA-CR-172780] N83-31595
STAINLESS STEELS
Ion-bombardment effects on the fatigue life of stainless steel under simulated fusion first-wall conditions
[DE83-007145] N83-31827
STANDARDS
Effects of standard extremity on mixed standard scale performance ratings
[AD-A128645] N83-32310
Cost-benefit impact study on the adoption of the draft proposed revised X3.23 American National Standard Programming Language COBOL
[PB83-191098] N83-32395
Suitability of a wall-stabilized arc as a transfer standard of spectral radiance in the spectral range 165 to 350 nm
[NPL-QU-65] N83-32479
NASA publications guide
[NASA-SP-7047] N83-32671
STANDING WAVES
Rotational and irrotational freestream disturbances interacting inviscidly with a semi-infinite plate
[AD-A127009] N83-31998
System for controlled acoustic rotation of objects
[NASA-CASE-NPO-15522-1] N83-32516
STARS
A program of ground-based astronomy to complement Einstein observations
[AD-A127148] N83-32691
STATISTICAL ANALYSIS
Effect of test result uncertainty on the performance of a context-free troubleshooting task
[AD-A128584] N83-31573
Statistical analysis of the daily streamflow hydrograph and a probability distribution of the interarrival times of peak flows-application to Indiana
[PB83-187153] N83-32171
Embeddings of Riesz subspaces with an application to mathematical statistics N83-32319
System analysis for the Huntsville Operational Support Center distributed computer system
[NASA-CR-170840] N83-32344
Cost-benefit impact study on the adoption of the draft proposed revised X3.23 American National Standard Programming Language COBOL
[PB83-191098] N83-32395
The importance of practice in the development of statistics
[AD-A127705] N83-32470
Multiprogram Laboratory Panel Energy Research Advisory Board. Volume 2: Support studies
[DE83-002694] N83-32668
STATISTICAL DISTRIBUTIONS
A new method for the analysis of extremes applicable to one year's data — wave height return values
[IOS-142] N83-32272
Interactive graphics package to facilitate a comparison of data with statistical distributions
[AD-A127147] N83-32372
A small sample evaluation of a Bayesian design method for quantal response model
[AD-A127942] N83-32464
FUN.STAT quantile approach to two sample statistical data analysis
[AD-A127672] N83-32467
STATISTICAL MECHANICS
Statistical mechanics of non-equilibrium processes in plasmas and gases
[AD-A128339] N83-32006
STATISTICAL TESTS
Significance points for some tests of uniformity on the sphere, revision
[AD-A128027] N83-32435
STEADY STATE
Study of heat and mass transfer in a vertical-tube evaporative cooler
[DE83-003480] N83-32022
STEAM
Preliminary investigation of aluminum combustion in air and steam
[AD-A128566] N83-31757
STEEL STRUCTURES
Roll-bonded 300M/1010 steel metal-metal laminates: Forgeability, toughness, fatigue, and stress corrosion
[AD-A127541] N83-31826
STEELS
Structural element testing and real blade impact testing, volume 2
[AD-A127957] N83-31738
Procedure for testing mechanical properties of high-tensile alloy-steel bolts
[BLL-M-26991-(5828.4)] N83-31801
Effectiveness of boriding of steel in molten sodium-boron-silicate baths
[BLL-M-34988-(5828.4)] N83-31803
Analysis of experimental data on rolling of corrosion-resistant steel with hydraulic thrust
[BLL-M-35007-(5828.4)] N83-31806
Characteristics of heat-treatment of R6M5 high-speed powdered steel containing titanium carbide
[BLL-M-34959-(5828.4)] N83-31808
Problem of corrosion-resistant steels
[BLL-M-26995-(5828.4)] N83-31810
Achievements and advanced methods of protection of metal and metal articles from corrosion
[BLL-M-34975-(5828.5)] N83-31815
Effects of high heat input welding of construction steels A36, A514, and A516
[AD-A127083] N83-31820
Roll-bonded 300M/1010 steel metal-metal laminates: Forgeability, toughness, fatigue, and stress corrosion
[AD-A127541] N83-31826
Some aspects of the plastic deformation of phase mixtures with coarse microstructures
[DE83-001624] N83-31828
Study of intergranular embrittlement in Fe-12Mn alloys
[DE83-002623] N83-31835
Review of factors affecting microstructure and toughness in simulated heat-affected zones of structural steels
[PB83-180208] N83-31851
Development of narrow gap welding technology for extremely thick steel
[PB83-178913] N83-31909
Experimental determination of inter-lap pressure in coils of steel strip
[BLL-M-35006-(5828.4)] N83-32087
A general purpose residual stress analyzer
[AD-A127820] N83-32109
Buckling of steel-containment shells. Task 1B: Buckling of Washington Public Power Supply Systems' plant no. 2 containment vessel
[DE83-901036] N83-32118
The measurement of X-ray residual stress in textured cubic materials
[AD-A127822] N83-32620
STEEPEST DESCENT METHOD
Evaluating the detectability of Gaussian stochastic signals by steepest-descent integration
[AD-A127604] N83-32419
STELLAR ATMOSPHERES
The A-stars: Problems and perspectives. Monograph series on nonthermal phenomena in stellar atmospheres
[NASA-SP-463] N83-32693
STELLAR RADIATION
The net effect of many gravitational fields on the intensity of celestial light sources
[AD-A127514] N83-32694
STELLARATORS
Atomic physics processes in radial transport calculations
[DE83-007172] N83-32535

Proposed 60 GHz transmission line system for Electron Cyclotron Radiation Heating (ECRH) on W 7 Advanced Stellarator (AS)
[IPF-82-17] N83-32612

STEP FUNCTIONS
Plant step data and gain estimates in the robust feedback tuning regulator problem
[RR-211] N83-31991
Robust sampled regulators for stable systems from plant step data
[RR-213] N83-32459

STEPPING MOTORS
General-purpose stepping motor-encoder positioning subsystem with standard asychronous serial-line interface
[DE83-004634] N83-31987

STIFFENING
Optimum design of stiffened plates using the finite element method
[AD-A128556] N83-32110

STIRRING
Electromagnetic Stirred Mode Cavities (SMCs) --- metrology
[NPL-DES-75] N83-31955

STOCHASTIC PROCESSES
Statistical analysis of the daily streamflow hydrograph and a probability distribution of the interarrival times of peak flows-application to Indiana
[PB83-187153] N83-32171
Malliavin's calculus and stochastic integral representations of functionals of diffusion processes
[AD-A127726] N83-32427
Limit laws for the maximum of weighted and shifted I.I.D. random variables
[AD-A128359] N83-32438
A random tour process of known length between known end points
[AD-A128243] N83-32441
On confidence intervals for cyclic regenerative processes
[AD-A127761] N83-32444
The entropic penalty approach to stochastic programming
[AD-A127920] N83-32462
Estimation of a filtered marked Poisson process from noisy observations with applications to signal processing
[AD-A127692] N83-32466
A class of multivariate new better than used processes
[AD-A127535] N83-32469
Algorithmic methods in probability
[AD-A128536] N83-32475

STOKES LAW (FLUID MECHANICS)
Influence of surface tension minimum on surface and buoyancy driven flows in Stokes regime N83-31673

STOPPING POWER
Stopping powers and ranges of electrons and positrons
[PB83-175687] N83-32562

STORAGE BATTERIES
Iterative noise elimination preliminary report
[AD-A127756] N83-32519

STORAGE RINGS (PARTICLE ACCELERATORS)
Versatile secondary trigger for a multi-detector system
[DE83-04414] N83-31982
Photoelectron spectrometer for high-resolution angular resolved studies
[DE83-008687] N83-32033
The Brookhaven free-electron laser experiment
[DE83-002840] N83-32064
Determination of the angular and energy dependence of hard constituent scattering from pi-O pair events at the CERN intersecting storage rings
[DE83-002451] N83-32538
Luminosity of continuous beams with crossing angle
[DE83-003279] N83-32593

STORAGE TANKS
Design and development testing of an improved high-efficiency water heater
[DE83-006136] N83-31904

STRAIN GAGES
Development of a cryogenic windtunnel balance
[KB-TE-1-1173] N83-31611

STRAIN HARDENING
An improved strain hardening characterization in the ADINA code using the mechanical sublayer model
[AD-A128287] N83-32108

STRAIN RATE
Application of a third-invariant plasticity theory to concrete and soils
[AD-A127079] N83-32097
Fracture of hot-pressed silicon nitride at elevated temperatures
[DE83-005236] N83-32117

STRATIFICATION
On condition (a sub f) of a stratified mapping N83-32336

STRATIGRAPHY
Geology and engineering characteristics of selected low-permeability gas sands: A survey
[PB83-195099] N83-32230

STRATOSPHERE
Analysis of NOAA/Alaskan MST radar data
[AD-A127023] N83-31927
Atmospheric temperature profiles from Earth limb infrared measurements
[AD-A127536] N83-32214

STREAMS
Orientation study of northern Arkansas. National uranium resource evaluation program. Hydrogeochemical and steam-sediment reconnaissance
[DE83-001214] N83-32156
Hydrogeochemical and stream sediment reconnaissance, orientation study of central Louisiana: National uranium resource evaluation program
[DE83-001217] N83-32157
Daily flow statistics of Alaskan streams
[PB83-180133] N83-32166
Statistical analysis of the daily streamflow hydrograph and a probability distribution of the interarrival times of peak flows-application to Indiana
[PB83-187153] N83-32171

STRESS (PHYSIOLOGY)
Management's role for reducing employee stress
[AD-A127126] N83-32659

STRESS (PSYCHOLOGY)
Some effects of stress on users of a voice recognition system: A preliminary inquiry
[AD-A128559] N83-31944

STRESS ANALYSIS
Nondestructive stress measurements in aluminum
[AD-A127699] N83-31823
Stress analysis for anisotropic hardening in finite-deformation plasticity
[AD-A127063] N83-32098
An analysis of conical indentation of an elastic/perfectly plastic half-space by nonlinear finite element techniques
[AD-A127529] N83-32104
Distribution of tidal bottom stress in a New Hampshire estuary
[PB83-184085] N83-32276

STRESS CONCENTRATION
Procedure for testing mechanical properties of high-tensile alloy-steel bolts
[BLL-M-26991-(5828.4)] N83-31801
Determination of stress-concentration factor by the caustic curves method
[BLL-M-34987-(5828.4)] N83-32086

STRESS CORROSION
Use of analytical electron microscopy and Auger electron spectroscopy for evaluating materials
[DE83-003658] N83-31784

STRESS CORROSION CRACKING
The behaviour of welded high strength grain-refined steels under cathodic stress corrosion cracking conditions
[BLL-RISLEY-TR-4741-(9091.9F)] N83-31802
Roll-bonded 300M/1010 steel metal-metal laminates: Forgeability, toughness, fatigue, and stress corrosion
[AD-A127541] N83-31826

STRESS INTENSITY FACTORS
Applications of energy-release-rate techniques to part-through cracks in experimental pressure vessels
[DE83-003486] N83-32112
Fracture of hot-pressed silicon nitride at elevated temperatures
[DE83-005236] N83-32117

STRESS MEASUREMENT
Nondestructive stress measurements in aluminum
[AD-A127699] N83-31823

STRESS RELAXATION
Non-linear data fitting for analysis of friction stress and recovery in metal alloys
[NPL-DITC-13/82] N83-32093

STRESS TENSORS
Stress analysis for anisotropic hardening in finite-deformation plasticity
[AD-A127063] N83-32098

STRESS-STRAIN RELATIONSHIPS
Strain hardening of heavily cold-worked metals
[DE83-003544] N83-31840
Application of a third-invariant plasticity theory to concrete and soils
[AD-A127079] N83-32097
An improved strain hardening characterization in the ADINA code using the mechanical sublayer model
[AD-A128287] N83-32108

STRESSES
Fixture for environmental exposure of structural materials under compression load
[NASA-CASE-LAR-12602-1] N83-32081
Thermo-elastic-plastic analysis of a thick-walled cylinder with temperature-dependent yield stress
[AD-A127447] N83-32099

STRONG INTERACTIONS (FIELD THEORY)
Topics in phenomenology of unified gauge theories of weak, electromagnetic, and strong interactions
[DE83-004241] N83-32554

STRONGLY COUPLED PLASMAS
Thermal coupling and damage mechanims of 1.06 micron laser radiation and laser-produced plasma on selected materials
[AD-A127608] N83-32045

STRONTIUM
Activity of hydrogen in metal-hydrogen systems: Strontium, thorium-nitrogen and vandaium alloys
[DE83-004976] N83-31843

STRUCTURAL ANALYSIS
Structural element and real blade impact testing, volume 1
[AD-A127744] N83-31606
Structural element testing and real blade impact testing, volume 2
[AD-A127957] N83-31736
Computerized ultrasonic scanning bridge for defect imaging: Composite materials
[DE83-001539] N83-31741
An SEM analysis of bearing failure due to electrical arcing
[AD-A127827] N83-32071
Finite difference methods in vibration analysis N83-32090
Adaptive finite element processes in structural mechanics
[AD-A127010] N83-32096
Optimality criterion methods in structural optimization
[AD-A127991] N83-32106
Thermal-structural analysis of large space structures: A review of recent advances
[AD-A128016] N83-32107
An improved strain hardening characterization in the ADINA code using the mechanical sublayer model
[AD-A128287] N83-32108
Cross-sectional transmission electron microscopy of semiconductors
[DE83-003662] N83-32627
Nondestructive quality control discussed N83-32651

STRUCTURAL BASINS
Application of MSS/LANDSAT images to the structural study of recent sedimentary areas: Campos Sedimentary Basin, Rio de Janeiro, Brazil
[E83-10385] N83-32138
Effects of snow compaction on water release and sediment yield, Bridger Bowl Ski Area, Gallatin County, Montana
[PB83-186445] N83-32174

STRUCTURAL DESIGN
Commentary on Astron satellite N83-31624
Conceptual design report for a fusion engineering device
[DE83-002288] N83-32602

STRUCTURAL DESIGN CRITERIA
Design philosophy for high-resolution rate and throughput spectroscopy systems
[DE83-004117] N83-31782
Fossil fuel gasification technical evaluation services
[PB83-195107] N83-31894
Oak Ridge beam-analysis system
[DE83002587] N83-32035
Attitude control experiment of sounding rocket S-520-5 N83-32491
Four pi physics with the plastic ball
[DE83-004190] N83-32556
Disposal costs for SRP high-level wastes in borosilicate glass and crystalline ceramic waste forms
[DE83-003105] N83-32567
Fundamental limits on SQUID technology
[DE83-002561] N83-32629

STRUCTURAL ENGINEERING
Structural plastics design manual. Volume 2: Phases 2 and 3, chapters 5 - 10
[PB83-185595] N83-31885
Beam connector apparatus and assembly
[NASA-CASE-MFS-25134-1] N83-31895
Adaptive finite element processes in structural mechanics
[AD-A127010] N83-32096
Intertial survey application to civil works
[AD-A127508] N83-32153
Earthquake engineering research: 1982
[PB83-176032] N83-32229

STRUCTURAL PROPERTIES (GEOLOGY)
Application of MSS/LANDSAT images to the structural study of recent sedimentary areas: Campos Sedimentary Basin, Rio de Janeiro, Brazil
[E83-10385] N83-32138
Geophysical investigation of eastern Yakima Ridge, south-central Washington
[DE83-002618] N83-32225
Earthquake Engineering Research, 1982: Overview and recommendations
[PB83-176024] N83-32226
SUBGROUPS
Invariants of a maximal unipotent subgroup of a semi-simple group N83-32330
SUBMARINE CABLES
Protective coatings for marine cables
[BLL-M-34971-(5826.4)] N83-31812
SUBMARINES
ELF (Extremely Low Frequency) PVS (Propagation Validation System) field strength measurements, January 1977
[AD-A126265] N83-31942
SUBMERGED BODIES
Development and testing of a submersible motor pump driven by a solar cell generator
[BMFT-FB-T-83-081] N83-32074
SUBMILLIMETER WAVES
Millimeter microwave emission by use of plasma produced electrons orbiting a positively-charged wire
[AD-A127240] N83-32046
SUBSIDENCE
Characterization of subsidence over multiple-lift longwall panels
[DE83-001856] N83-32219
SUBSTRATES
Influence of composition and substrate bias on structure and inert-gas content of sputter-deposited Ni-La alloys
[DE83-002716] N83-31830
A method for making an alkaline battery electrode plate
[NASA-TM-77249] N83-31956
SUGAR CANE
Preliminary statistical studies concerning the Campos RJ sugar cane area, using LANDSAT imagery and aerial photographs
[E83-10384] N83-32137
SULFATES
Interpretations of the OSCAR data for reactive-gas scavenging
[DE83-003597] N83-32195
SULFONES
Early stages of sulfidation of iron and iron-chromium alloy in hydrogen sulfide
[DE83-004969] N83-31837
SUMMER
Low level convergence and the prediction of convective precipitation
[AD-A127673] N83-32236
SUNLIGHT
Cloud cover sensor
[NASA-CASE-NPO-14936-1] N83-32232
SUNSPOTS
Dynamical phenomena in sunspots
[AD-A126931] N83-32698
Comparison of heliospheric current sheet structure obtained from potential magnetic field computations and from observed polarization coronal brightness
[NASA-CR-172832] N83-32700
Alfven waves in the solar wind in association with solar energetic particles: Sunspot umbral origin
[AD-A128046] N83-32701
SUPERCONDUCTING MAGNETS
High-field superconducting window-frame beam-transport magnets
[DE83-004592] N83-32512
Large scale superfluid practice
[DE83-001563] N83-32513
SUPERCONDUCTIVITY
High-field superconducting window-frame beam-transport magnets
[DE83-004592] N83-32512
SUPERCONDUCTORS
Studies of a molybdenum-molybdenum bonded species. 1: Synthesis and characterization of a reduction product of Cs3Mo2Cl8H. 2: Mixed sulfur/chlorine-substituted hexanuclear and molybdenum clusters
[DE83-04971] N83-31879
The NMR (Nuclear Magnetic Resonance) sensor for calibrating the field of a superconducting solenoid
[AD-A127997] N83-31973
Fault-current limiter using a superconducting coil
[DE83-003557] N83-31986
Fundamental limits on SQUID technology
[DE83-002561] N83-32629
Doping and transport studies in In/sub x/Ga/sub 1-x/As/GaAs strained-layer superlattices
[DE83-003915] N83-32640
SUPERCOOLING
Supercooled water
[AD-A127539] N83-31753
SUPERFLUIDITY
Remarks on thermal properties of rotating superfluid helium in a gravitational field N83-32502
Large scale superfluid practice
[DE83-001563] N83-32513
SUPERNOVAE
A program of ground-based astronomy to complement Einstein observations
[AD-A127148] N83-32691
SUPERSONIC FLOW
Wind-tunnel investigation of leading-edge thrust on arrow wings in supersonic flow
[NASA-TP-2167] N83-31577
Flow of gas-particle mixtures
[AD-A127466] N83-32001
SURFACE ACOUSTIC WAVE DEVICES
Multifunction spread spectrum technology
[AD-A127045] N83-31929
SURFACE COOLING
Thermal impact of waste emplacement and surface cooling associated with geologic disposal of nuclear waste
[DE83-007314] N83-32565
SURFACE DEFECTS
Three laser scanning instruments for automatic surface inspection N83-32578
SURFACE DIFFUSION
Infrared spectra of CO adsorbed at low temperatures on Ni
[DE83-001568] N83-31765
SURFACE FINISHING
The development and evaluation of point defect models for the growth of passive films on single crystal, polycrystalline, and amorphous metal surfaces
[AD-A128333] N83-32619
SURFACE PROPERTIES
Contact-potential and surface-charge effects in atmospheric-electrical instrumentation
[NASA-CR-172834] N83-32027
Three laser scanning instruments for automatic surface inspection N83-32578
The 4th Symposium on Applied Surface Analysis: Parts 1 and 2
[AD-A127109] N83-32615
Fermi-surface properties of CeSn-3 and related compounds
[DE83-008606] N83-32621
SURFACE REACTIONS
Turbulent boundary layer over a flat plate with strong stepwise heating
[DE83-001554] N83-32018
Electron and photon stimulated desorption: Benefits and pitfalls
[AD-A128239] N83-32527
SURFACE STABILITY
Binocular shading and visual surface reconstruction
[AD-A127058] N83-32580
SURFACE TEMPERATURE
Evapotranspiration estimates based on surface temperature and net radiation: Development of remote sensing methods
[PB83-175307] N83-32163
Airborne-temperature-survey maps of heat-flow anomalies for exploration geology
[DE82-019111] N83-32224
SURFACE WAVES
A variational approach to surface solitary waves
[AD-A127707] N83-32000
Surface acoustic wave non-linear interactions in lithium niobate
[AD-A127570] N83-32052
SURFACES
Recent developments in the investigations on the gas-surface interactions N83-32499
SURGES
The West Coast surge prediction experiment 1981-82
[IOS-150] N83-32273
SURVEYS
Methods of hydrographic surveying used by different countries
[AD-A128576] N83-32154
A survey of software quality assurance methods and an evaluation of software quality assurance at Fleet Material Support Office
[AD-A127676] N83-32378
SURVIVAL
A computer simulation of aircraft evacuation with fire
[NASA-CR-166511] N83-31586
SWEPT FORWARD WINGS
Wind tunnel experiments on the divergence of swept wings with composite structures
[AD-A127950] N83-31582
SWEPT WINGS
Aeroelastic properties of straight and forward swept graphite/epoxy wings
[AD-A127014] N83-31734
SWINGBY TECHNIQUE
Interplanetary mission designs by multiple Earth-Venus-Jupiter swingbys N83-32489
SWITCHES
Electronic time switch evaluation study
[AD-A127870] N83-31964
SYMMETRY
Buckling of steel-containment shells. Task 1B: Buckling of Washington Public Power Supply Systems' plant no. 2 containment vessel
[DE83-901036] N83-32118
SYNCHRONISM
Synchronized voltage contrast display analysis system
[NASA-CASE-NPO-14567-1] N83-31919
High efficiency picosecond pulse generation in the 675-930 NM region from a dye laser synchronously pumped by an argon-ion laser
[AD-A128033] N83-32058
SYNCHROTRON RADIATION
High-resolution X-ray scattering
[DE83-004599] N83-32592
SYNCHROTRONS
High-resolution X-ray scattering
[DE83-004599] N83-32592
SYNTHESIS (CHEMISTRY)
Synthesis of hydroxy-terminated dinitropropyl acrylate polymers and improved characterization of hydroxy-terminated prepolymers
[AD-A127469] N83-31866
Studies of a molybdenum-molybdenum bonded species. 1: Synthesis and characterization of a reduction product of Cs3Mo2Cl8H. 2: Mixed sulfur/chlorine-substituted hexanuclear and molybdenum clusters
[DE83-04971] N83-31879
SYNTHETIC APERTURE RADAR
Multibeam single frequency synthetic aperture radar processor for imaging separate range swaths
[NASA-CASE-NPO-14525-2] N83-31918
SYNTHETIC FUELS
Fossil fuel gasification technical evaluation services
[PB83-195107] N83-31894
SYSTEM EFFECTIVENESS
Environmental standards for electro-optical systems
[AD-A127776] N83-32588
SYSTEM FAILURES
Fault diagnosis of nonlinear analog circuits. Volume 3: Fault diagnosis in the tableau context
[AD-A127019] N83-31960
Relationship between manufacturing yields and field failure rates of electronic equipment
[AD-A128498] N83-32078
Failure detection with uncertain models
[NASA-CR-172835] N83-32417
SYSTEMS ANALYSIS
Automated instrumentation system verification
[AD-A127775] N83-32030
Integration analysis: A proposed integration of test and evaluation techniques for early on detection of human factors engineering discrepancies
[AD-A127611] N83-32314
Systems overview of the subseabed disposal program
[DE83-000091] N83-32569
SYSTEMS ENGINEERING
Flexible manufacturing system handbook. Volume 2: Description of the technology
[AD-A127928] N83-31900
POD-HOS (Performances Oriented Design-Higher Order Software) interfaces: An examination of AXES/POD relationships and other issues
[AD-A128301] N83-32384
Interactive automated system for normalization of relations
[AD-A127496] N83-32673

T

TABLES (DATA)
SESAME '83: Report on the Los Alamos equation-of-state library
[DE83-008283] N83-32388
Stopping powers and ranges of electrons and positrons
[PB83-175687] N83-32562
Final Tactical Decision Aid (FTDA) for infrared (8-12 micrometers) systems, manual version. Appendix B: Insolation and sky radiation tables
[AD-A127853] N83-32699

TAKEOFF
Potential joint civil and military use of military airfields
[PB83-186734] N83-31616
TAPE RECORDERS
Operating instructions manual for Microprocessor Airborne Data Acquisition and Replay (MADAR) module
[AD-A128558] N83-32031
TAPERING
Research progress and forecast report for MSNW FEL oscillator program
[AD-A127786] N83-32061
TARGET RECOGNITION
Enhancing perceptibility of barely perceptible targets
[AD-A127569] N83-32582
Intelligent interpretation of 3-D imagery
[AD-A127710] N83-32583
Evaluation of infrared target discrimination algorithms
[AD-A128283] N83-32587
Environmental standards for electro-optical systems
[AD-A127776] N83-32588
TARGETS
Method and apparatus for producing gas-filled hollow spheres --- target pellets for inertial confinement fusion
[NASA-CASE-NPO-14596-3] N83-31896
Use of induced spatial incoherence for uniform illumination on laser fusion targets
[AD-A127612] N83-32050
Two models of time constrainted target travel between two endpoints constructed by the application of Brownian motion and a random tour
[AD-A127805] N83-32448
TAXONOMY
Taxonomy of tool features for the Ada (trade name) Programming Support Environment (APSE)
[PB83-179002] N83-32349
Error taxonomy: What can be gained? N83-32366
TEARING
Tear strength of elastomers under threshold conditions
[AD-A127006] N83-31857
TEARING MODE (PLASMAS)
Saturated tearing modes in Tokamaks with divertors
[DE83-005589] N83-32598
TECHNICAL WRITING
NASA publications guide
[NASA-SP-7047] N83-32671
TECHNOLOGICAL FORECASTING
Laser applications present and future: Prospects for significant occupational safety and health impact
[PB83-184507] N83-32066
Includes information about the Scientific Committee NLR-NIVR, internation colaboration in the framework of AGARD, ETW and Garteur and also about the colaboration with Indonesia N83-32705
TECHNOLOGY ASSESSMENT
New features of the European microgravity programs N83-31639
Technical considerations in choosing alcohol fuels for less-developed countries
[DE83-004644] N83-31891
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 7: Built-In Testing (BIT) and Built-In Test Equipment (BITE)
[AD-A128587] N83-31975
Drilling at accesses to Earth's mantle N83-32122
Research needs of the new accelerator technologies
[DE83-000518] N83-32541
Collective effect accelerators and the challenge of attaining ultra-high energies
[DE83-002566] N83-32542
USSR report: Science and technology policy, no. 9
[JPRS-82713] N83-32647
Methods discussed for accelerating adoption of scientific achievements N83-32648
Results of comprehensive programs summarized N83-32650
Technology and handicapped people
[GPO-12-921] N83-32686
TECHNOLOGY TRANSFER
Space station needs, attributes and architecture options study technology development working group briefing
[NASA-CR-172949] N83-31716
Satellite Data Distribution System (SDDS). The development and demonstration of new fisheries support products based on remote ocean sensing from satellites
[E83-10399] N83-32147
Measures to address the impact of computer technology on lesser developed countries
[GPO-99-819] N83-32343
Results of comprehensive programs summarized N83-32650
Research in space commercialization, technology transfer, and communications, volume 2
[NASA-CR-172955] N83-32657
Bibliography of appropiate technology information for developing countries: Selected abstracts from the NTIS data file (Fourth Edition)
[PB83-113852] N83-32669
Technical Information Clearinghouse Fund Act of 1983
[H-REPT-98-94] N83-32685
The commercialization of new technologies transfer from laboratory to firm
[AD-A128233] N83-32688
TECHNOLOGY UTILIZATION
Skin technology: Fundamentals and applications --- in space processing N83-31693
TECTONICS
Application of MSS/LANDSAT images to the structural study of recent sedimentary areas: Campos Sedimentary Basin, Rio de Janeiro, Brazil
[E83-10385] N83-32138
Evaluation of potential surface faulting and other tetonic deformation
[DE83-900503] N83-32222
TELECOMMUNICATION
Customer premises services market demand assessment 1980 - 2000. Volume 1: Executive summary
[NASA-CR-168150] N83-31925
Customer premises services market demand assessment 1980 - 2000: Volume 2
[NASA-CR-168151] N83-31926
Naval communications processing and routing system (NAVCOMPARS): A model for broadcast performance analysis
[AD-A127990] N83-31940
Composite coaxial telecommunications cable
[AD-A127810] N83-31969
TELECONFERENCING
Development of teleconferencing methodologies with emphasis on virtual space video and interactive graphics
[AD-A127738] N83-31935
TELEPHONES
Electronic technology (selected articles)
[AD-A127809] N83-31970
TELESCOPES
Image motion compensation by area correlation and centroid tracking of solar surface features
[NASA-TM-82538] N83-32690
TELEVISION SYSTEMS
Development of teleconferencing methodologies with emphasis on virtual space video and interactive graphics
[AD-A127738] N83-31935
TELEVISION TRANSMISSION
Electronic technology (selected articles)
[AD-A127809] N83-31970
TELLURIUM ALLOYS
Directional crystallization of Pb Te under microgravity conditions N83-31703
TEMPERATURE DISTRIBUTION
Diffusion of hydrogen and deuterium in Zr-Al
[DE83-002214] N83-31829
TEMPERATURE EFFECTS
Jurist comments on legal questions regarding US shuttle N83-31631
The influence on the Marangoni effect of a surface tension minimum as a function of temperature in microgravity conditions N83-31669
Influence of temperature-deformation conditions on mechanical properties of rolled plate after straightening
[BLL-M-26987-(5828.4)] N83-31809
Ambient and cryogenic temperature testing of a 32-channel CMOS multiplexer
[NASA-TM-84385] N83-31957
TEMPERATURE GRADIENTS
Heat transfer induced performance characteristics of gradient type furnaces --- spaceborne experiment N83-31654
Stationary and oscillatory instabilities for mixture subjected to Soret effect in vertical cylinder with axial temperature gradient N83-31661
Airborne-temperature-survey maps of heat-flow anomalies for exploration geology
[DE82-019111] N83-32224
Thermal-gradient migration of brine inclusions in salt crystals
[DE83-004180] N83-32633
TEMPERATURE MEASUREMENT
Wellborne inertial navigation system
[DE83-004012] N83-31593
Rotational temperature measurements in free jet expansions on N sub 2 using electron beam fluorescence technique N83-32496
Some experiments in low-temperature thermometry
[DE83-004179] N83-32510
TEMPERATURE PROFILES
Analysis of field-performance data on shell-and-tube heat exchangers in geothermal service
[DE83-001564] N83-32014
TEMPERATURE SCALES
Some experiments in low-temperature thermometry
[DE83-004179] N83-32510
TEMPORAL DISTRIBUTION
Variability of precipitation in the Pacific Northwest: Spatial and temporal characteristics
[PB83-175232] N83-32249
TENSILE PROPERTIES
Integrally cast low-cost compressor
[AD-A127663] N83-31824
Roll-bonded 300M/1010 steel metal-metal laminates: Forgeability, toughness, fatigue, and stress corrosion
[AD-A127541] N83-31826
TENSILE TESTS
Procedure for testing mechanical properties of high-tensile alloy-steel bolts
[BLL-M-26991-(5828.4)] N83-31801
TERMINOLOGY
Glossary of software engineering laboratory terms
[NASA-TM-85395] N83-32354
TERNARY ALLOYS
A study of the uranium-aluminum-silicon system
[DE83-002345] N83-31836
TERRAIN
A model for the surface wind field in complex terrain
[AD-A127030] N83-32234
TEST EQUIPMENT
Better results from development of technical equipment N83-32649
TEST FACILITIES
Relationship of an in-situ test facility to a deep geologic repository for high-level nuclear waste, task 4
[DE83-901818] N83-31726
Experience with non-destructive testing of rolled product quality at the Orsk Khalilovo Works
[BLL-M-34974-(5828.4)] N83-32076
Findings and recommendations on various marine, atmospheric, and coastal zone issues
[PB83-186213] N83-32120
TEST PATTERN GENERATORS
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 4: Test generation
[AD-A127985] N83-31967
TEST RANGES
Tonopah Test Range capabilities: Technical manual
[DE83-005362] N83-31709
TETRAHYDROFURAN
Diallyl phthalate prepolymer characterization and testing in fiberglass filled molding compounds
[DE83-009352] N83-31874
THEMATIC MAPPING
LANDSAT-D investigations in snow hydrology --- Sierra Nevada Mountains
[E83-10382] N83-32135
A preliminary evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies
[E83-10383] N83-32136
Evaluation of spatial, radiometric and spectral thematic mapper performance for coastal studies
[E83-10386] N83-32139
LANDSAT-D investigations in snow hydrology --- Sierra Nevada Mountains, California
[E83-10388] N83-32141
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration
[E83-10389] N83-32142
Investigation of several aspects of LANDSAT-4 data quality
[E83-10390] N83-32143
Snow reflectance from thematic mapper
[E83-10391] N83-32144
THEOREMS
Orthomorphisms and the Radon-Nikodym Theorem revisited N83-32321
On the Radon-Nikodym Theorem N83-32322
THEORETICAL PHYSICS
Search for new heavy techniparticles
[DE83-003945] N83-32551
Neutrino mixing in grand unified models
[DE83-004342] N83-32552
Why QCD lattice theory is important to spin physicists
[DE83-003955] N83-32638
Lattice guage theories
[DE83-002827] N83-32639
THERMAL CONDUCTIVITY
Thermal conductivity measurement on fluids under microgravity using holographic interferometry N83-31699
Calculation of turbulent convective heat exchange in a cylindrical channel with a sudden expansion: Communication 2
[BLL-M-34991-(5828.4)] N83-31995
An effect of turbulent diffusion on the glow discharge-to-arc transition
[AD-A128553] N83-32009

The applicability of earth coupled heat pumps and factors affecting their performance
[DE83-004616] N83-32021
High-purity germanium crystal growing
[DE83-004181] N83-32632
THERMAL CYCLING TESTS
Halogen Occultation Experiment (HALOE) gas cell life test program
[NASA-TM-84640] N83-32028
THERMAL DIFFUSION
Measurement of the critical Marangoni number in a floating zone under reduced gravity N83-31671
Buoyancy-thermocapillary convection: The role of interfacial deformation N83-31674
Numerical solutions of floating-zone thermocapillary flows N83-31675
THERMAL EXPANSION
Effects of irradiation on ceramics for fusion-reactor applications
[DE83-009468] N83-31872
THERMAL PROTECTION
Silicon-slurry/aluminide coating — protecting gas turbine engine vanes and blades
[NASA-CASE-13343-2] N83-31795
Thermal barrier coating system having improved adhesion
[NASA-CASE-LEW-13359-1] N83-31855
THERMAL RESISTANCE
Unstable phenomena in a two-phase closed thermosyphon N83-32506
THERMAL STABILITY
High-field superconducting window-frame beam-transport magnets
[DE83-004592] N83-32512
THERMAL STRESSES
Applications of energy-release-rate techniques to part-through cracks in experimental pressure vessels
[DE83-003486] N83-32112
THERMIONIC CONVERTERS
Thermionic energy converters
[NASA-CASE-LEW-12443-1] N83-32175
THERMOCHEMISTRY
Austenitic thermochemical treatments in a glow discharge
[PB83-184671] N83-31852
Hydrogen and oxygen from water. Part 6: Quenching the effluent from a solar furnace
[AD-A127457] N83-32182
THERMOCOUPLES
Experimental and analytical study of natural-convection heat transfer of internally heated liquids
[DE83-005384] N83-32013
THERMODYNAMIC EFFICIENCY
Emission characteristics of a medium-speed diesel using water-emulsified residual fluids
[DE83-001552] N83-32073
THERMODYNAMIC PROPERTIES
Supercooled water
[AD-A127539] N83-31753
Thermodynamic functions of carbon solution in liquid nickel and cobalt
[BLL-M-34981-(5828.4)] N83-31816
Heat-transfer characteristics of dry porous particulate beds with internal heat generation — for reactor safety considerations N83-32012
Remarks on thermal properties of rotating superfluid helium in a gravitational field N83-32502
Studies on condensation heat transfer in two-phase closed thermosyphons N83-32505
Unstable phenomena in a two-phase closed thermosyphon N83-32506
Therymodynamic properties of strongly nonideal fluid mixtures from an xtended quasi-chemical theory
[DE83-004295] N83-32645
THERMODYNAMICS
Integrally cast low-cost compressor
[AD-A127663] N83-31824
Activity of hydrogen in metal-hydrogen systems: Strontium, thorium-nitrogen and vandaium alloys
[DE83-004976] N83-31843
Hydrogen and deuterium diffusion in vanadium alloys
[DE83-004964] N83-31845
Structural reliability of yttria-doped, hot-pressed silicon nitride at elevated temperatures
[AD-A127583] N83-31862
Heat transfer to water from a vertical tube bundle under natural-circulation conditions
[DE83-008459] N83-32010
Geotechnical instrumentation requirements for at-depth testing and repository monitoring in tuff
[DE83-002188] N83-32034
Thermal-structural analysis of large space structures: A review of recent advances
[AD-A128016] N83-32107
WATEQ3 geochemical model: Thermodynamic data for several additional solids
[DE83-000896] N83-32155
Evapotranspiration estimates based on surface temperature and net radiation: Development of remote sensing methods
[PB83-175307] N83-32163
SESAME '83: Report on the Los Alamos equation-of-state library
[DE83-008283] N83-32388
Mathematical representation of size and electronic factors
[DE83-004182] N83-32455
Heat transfer rate of looped type heat pipes using water and Nak as working fluid under liquid phase flow N83-32508
THERMOLUMINESCENCE
Characteristics of thermoluminescence glow curves for materials exhibiting more than one glow peak
[DE83-004602] N83-31778
Beta and low-energy photon irradiation of several commercial phosphors
[DE83-006606] N83-32531
THERMOMAGNETIC EFFECTS
Martensite structure after thermal-magnetic and thermal-mechanical-magnetic treatment
[BLL-M-34939-(5828.4)] N83-31796
THERMOMECHANICAL TREATMENT
Martensite structure after thermal-magnetic and thermal-mechanical-magnetic treatment
[BLL-M-34939-(5828.4)] N83-31796
THERMOMETERS
Noise thermometry measurements in combustion processes
[AD-A127945] N83-31758
Some experiments in low-temperature thermometry
[DE83-004179] N83-32510
THERMONUCLEAR REACTIONS
Thermonuclear model for high energy transients — X-ray and gamma ray bursts
[DE83-002814] N83-32566
THERMOPLASTIC RESINS
Method for the preparation of polymers
[DE83-004941] N83-31880
Advanced inorganic separators for alkaline batteries and method of making the same
[NASA-CASE-LEW-13171-2] N83-32176
THERMOREGULATION
Temperature cycling in rats exposed repetitively to radiofrequency radiation
[AD-A126895] N83-32281
Thermoregulatory responses to upper body exercise
[AD-A127884] N83-32298
THERMOSIPHONS
Behaviour of a 6 m high thermosiphon — cryopumps
[OUEL-1460/83] N83-32514
THERMOSPHERE
Empirical modeling of the geomagnetic variation in the thermosphere
[AD-A127007] N83-32207
A comparison of the MSIS and Jacchia-70 models with measured atmospheric density data in the 120 to 200 km altitude range
[AD-A128005] N83-32216
THETA PINCH
Burn dynamic experiment based on the field-reversed theta pinch
[DE83-005071] N83-32607
THICK WALLS
Thermo-elastic-plastic analysis of a thick-walled cylinder with temperature-dependent yield stress
[AD-A127447] N83-32099
THICKNESS
Diffusion of hydrogen and deuterium in Zr-Al
[DE83-002214] N83-31829
Rapid solidification studies of Ni3Al alloys
[DE83-004648] N83-31838
THIN FILMS
Infrared spectra of CO adsorbed at low temperatures on Ni
[DE83-001568] N83-31765
Schottky and MIS type amorphous-silicon solar cells
[BMFT-FB-T-83-043] N83-32184
The 4th Symposium on Applied Surface Analysis: Parts 1 and 2
[AD-A127109] N83-32615
Thin films from ammonia-borane
[DE83-003567] N83-32628
THOMSON SCATTERING
Recent advances in Thomson scattering: High repetition rate Thomson scattering diagnostics on large plasma devices
[IPF-82-15] N83-32610
Proposal for a new Thomson scattering technique for large fusion devices
[IPF-82-16] N83-32611
THORIUM
Activity of hydrogen in metal-hydrogen systems: Strontium, thorium-nitrogen and vandaium alloys
[DE83-004976] N83-31843
THREE DIMENSIONAL FLOW
Aerodynamics of airfoils subject to three-dimensional periodic gusts
[AD-A127043] N83-31581
Theoretical investigation of three-dimensional shock wave-turbulent boundary layer interactions
[AD-A127118] N83-31999
THRESHOLD CURRENTS
Electrical-breakdown characteristics and testing of high-voltage XLPE- and EPR-insulated cables
[DE83-000721] N83-31989
THRUST CONTROL
Aerodynamic ejectors in the UK
[BAE-KRS-N-GEN-243] N83-31594
THUNDERSTORMS
Low level convergence and the prediction of convective precipitation
[AD-A127673] N83-32236
TIDAL WAVES
The West Coast surge prediction experiment 1981-82
[IOS-150] N83-32273
TIME
Dynamic scaling of manipulator trajectories
[AD-A127074] N83-32313
TIME DEPENDENCE
A PACER: A Monte Carlo time-dependent spectrum program for generating few-group diffusion-theory cross sections
[DE83-003779] N83-32351
TIME DISCRIMINATION
A simple multifunction discriminator for multichannel triggers
[DE83-004193] N83-31981
TIME DIVISION MULTIPLE ACCESS
A time slot assignment algorithm for a TDMA packet radio network
[AD-A128545] N83-31947
A collision resolution protocol with limited channel sensing: Finitely many users
[AD-A128501] N83-31948
TIME MEASUREMENT
Characteristics of thermoluminescence glow curves for materials exhibiting more than one glow peak
[DE83-004602] N83-31778
TIME OF FLIGHT SPECTROMETERS
Ion time-of-flight spectroscopy: Krypton charge-state spectra as a function of photon excitation energy near the K edge
[DE83-002221] N83-32550
TIME SERIES ANALYSIS
The asymptotic variance of higher order crossings
[AD-A127459] N83-32430
Estimation of a filtered marked Poisson process from noisy observations with applications to signal processing
[AD-A127692] N83-32466
TIME SHARING
Low cost satellite for fast interactive graphics in a time-sharing environment
[PB83-187336] N83-32396
TIMING DEVICES
Flight termination system equipment. Volume 3: Relays, timers, and switches
[AD-A127479] N83-31708
Electronic time switch evaluation study
[AD-A127870] N83-31964
Timing and control monitor system requirements
[DE83-005343] N83-32246
TIN
Fermi-surface properties of CeSn-3 and related compounds
[DE83-008606] N83-32621
TIN ALLOYS
Solidification of PbSn alloys under microgravity conditions N83-31701
TITANIUM ALLOYS
Structural element testing and real blade impact testing, volume 2
[AD-A127957] N83-31738
On fatigue crack growth in a Ti-4, 5Al-5Mo-1.5Cr alloy with metastable beta-phase
[AD-A128048] N83-31825
Corrosion resistant canisters for nuclear waste isolation
[DE83-000090] N83-32564
TITANIUM CARBIDES
Characteristics of heat-treatment of R6M5 high-speed powdered steel containing titanium carbide
[BLL-M-34959-(5828.4)] N83-31808
TOKAMAK DEVICES
Diffusion of hydrogen and deuterium in Zr-Al
[DE83-002214] N83-31829

Nonthermal ultrasoft X-ray spectra on ZT-40M
[DE83-007123] N83-32534
Atomic physics processes in radial transport calculations
[DE83-007172] N83-32535
Status of DOE's implementation of the magnetic fusion energy engineering act of 1980
[GAO/RCED-83-105] N83-32594
Constrained ripple optimization of Tokamak bundle divertors
[DE83-006363] N83-32597
Saturated tearing modes in Tokamaks with divertors
[DE83-005589] N83-32598
Magnetic fusion energy and computers. The role of computing in magnetic fusion energy research and development
[DE83-006565] N83-32599
Continuous Tokamak operation with an internal transformer
[DE83-002340] N83-32600
Diagnostics for neutral-beam-heated Tokamaks
[DE83-005049] N83-32605
Recent advances in Thomson scattering: High repetition rate Thomson scattering diagnostics on large plasma devices
[IPF-82-15] N83-32610

TOLERANCES (PHYSIOLOGY)
The thermal basis for disruption of operant behavior by microwaves in three animal species
[AD-A127370] N83-32279
Temperature cycling in rats exposed repetitively to radiofrequency radiation
[AD-A126895] N83-32281

TOMOGRAPHY
Iterative noise elimination preliminary report
[AD-A127756] N83-32519
Dual 7 pinhole tomography
[DE83-004589] N83-32591

TOPOGRAPHY
Space survey techniques benefit geology N83-31630
Improving watershed-model accuracy by using digital topography
[PB83-178137] N83-32165
Geophysical investigation of eastern Yakima Ridge, south-central Washington
[DE83-002618] N83-32225
Global analysis of the shallow geology of large-scale ocean slopes
[AD-A128208] N83-32267

TOPOLOGY
Annals of the Fourier Institute, volume 33, number 1
[ISSN-0373-0956] N83-32329
On condition (* sub f) of a stratified mapping N83-32336
The density of the leaves of certain Pfaff equations with two variables N83-32337
The germs of diffeomorphisms and of vector fields in the class of finite differentialability N83-32338
Degree of the fibers of an elliptic fibration N83-32339
Fiber cobordism and approximation of a singular submanifold by C(infinity) N83-32340

TOROIDAL PLASMAS
Drag instability in the modified betatron
[AD-A128242] N83-32526

TORQUE
Directed solidification of 40KKhNM alloy as a further means of improving the torques of small winding springs
[BLL-M-34969-(5826.4)] N83-31814

TORSION
Strain hardening of heavily cold-worked metals
[DE83-003544] N83-31840

TOTAL ENERGY SYSTEMS
Performance analysis of the Jersey City Total Energy Site
[PB83-185348] N83-32187

TOUGHNESS
Standard tests for toughened resin composites, revised edition
[NASA-RP-1092-REV] N83-31730
Roll-bonded 300M/1010 steel metal-metal laminates: Forgeability, toughness, fatigue, and stress corrosion
[AD-A127541] N83-31826
Design of strong, ductile, duplex low alloy steels
[DE83-002606] N83-31834
X-ray topographic fractography of single crystals of molybdenum and niobium
[DE83-005066] N83-32642

TOXIC HAZARDS
Polyurethane paint (PUP) Chemical Agent Resistant Coating (CARC) for Army aircraft
[AD-A128006] N83-31868
Post accident procedures for chemicals and propellants
[AD-A127505] N83-32661

TRACKING (POSITION)
A post-processing algorithm for time domain pitch trackers
[AD-A127671] N83-31934
BAYR, a data association algorithm based on a Bayesian recursion
[AD-A127460] N83-32468

TRACKS
A random tour process of known length between known end points
[AD-A128243] N83-32441

TRAILING EDGES
Lift generation due to vortex shedding N83-32488

TRAINING ANALYSIS
The application of distributed system architectures for computer-based instructional systems in the Naval Education and Training Command
[AD-A127694] N83-32347

TRAINING SIMULATORS
Cosmonaut training simulators at Zvezdnyy Gorodok described N83-31623

TRAJECTORIES
Dynamic scaling of manipulator trajectories
[AD-A127074] N83-32313

TRAJECTORY ANALYSIS
Flight control center's history, functions spotlighted N83-31626
The trajectory of a heated, buoyant jet in a non-uniform cross-flow
[BAE-KAD-GEN-N-2868] N83-31994

TRAJECTORY OPTIMIZATION
Optimization of low thrust trajectories for collinear Lagrange point mission N83-32490

TRANSFER FUNCTIONS
Low-pressure transfer operations
[DE83-003443] N83-32011

TRANSFERRING
Suitability of a wall-stabilized arc as a transfer standard of spectral radiance in the spectral range 165 to 350 nm
[NPL-QU-65] N83-32479

TRANSFORMATIONS (MATHEMATICS)
Significance points for some tests of uniformity on the sphere, revision
[AD-A128027] N83-32435

TRANSIENT RESPONSE
The TOPSY guide. Transient tunnel operating, data acquisition and processing system. User's and programmer's guides
[OUEL-1462/83] N83-31610
Plant step data and gain estimates in the robust feedback tuning regulator problem
[RR-211] N83-31991

TRANSITION METALS
Halide and chalcogenide clusters of the early transition metals
[DE83-003792] N83-31841

TRANSITION POINTS
The brittle to ductile transition in polycrystalline ice under tension
[AD-A127701] N83-32102

TRANSLATING
Notes on the conversion of logLisp from Rutgers/UCI-Lisp to interLisp
[AD-A127718] N83-32380

TRANSLATIONAL MOTION
Translation nonequilibrium in a rapid expansion flow from a high temperature source N83-32498

TRANSMISSION
Nonthermal ultrasoft X-ray spectra on ZT-40M
[DE83-007123] N83-32534

TRANSMISSION LINES
Service life evaluation of rigid explosive transfer lines
[NASA-TP-2143] N83-31596
Equipment qualification research test of electrical cable with factor splices and insulation rework: Test no. 2, report no. 1
[DE83-002165] N83-31980
Electrical-breakdown characteristics and testing of high-voltage XLPE- and EPR-insulated cables
[DE83-000721] N83-31989
Optimized couplers between junction lasers and single-mode fibers
[AD-A128040] N83-32056
Computer optical fiber data transmission system
[AD-A127724] N83-32585

TRANSMITTANCE
Comparison of modelled and empirical atmospheric propagation data
[E83-10398] N83-32146

TRANSMITTERS
ODAD-451 data buoy in the north-east Atlantic (61 deg 36'N, 13 deg 24'W)
[PB83-183806] N83-32275

TRANSONIC FLOW
Improved method for transonic airfoil design-by-optimization
[NASA-CR-166497] N83-31578
Grid network generation with adaptive boundary points for projectiles at transonic speed
[AD-A128041] N83-31584
New considerations on scale extrapolation of wing pressure distributions affected by transonic shock-induced separations
[NASA-CR-166426] N83-31597
Discretization and solution techniques for Navier-Stokes and transonic flow problems
[AD-A127944] N83-32002
Frequency effect of transonic flow over an oscillating airfoil N83-32486

TRANSONIC SPEED
Grid network generation with adaptive boundary points for projectiles at transonic speed
[AD-A128041] N83-31584

TRANSPORT PROPERTIES
Supercooled water
[AD-A127539] N83-31753
Simple theory for maximum H inventory and release: A new transport parameter
[DE82-014076] N83-32641

TRANSPORT THEORY
Development and application of the discrete ordinates-transfer matrix hybrid method for deterministic streaming calculations
[DE82-017387] N83-32457
Recent developments in the investigations on the gas-surface interactions N83-32499

TRAVELING SOLVENT METHOD
LDEF experiments: Crystal growth by a solute diffusion process N83-31664

TRAVELING WAVE TUBES
DSCS 2 LLTWTA helix current anomaly
[AD-A128008] N83-31972

TRAVELING WAVES
Traveling-wave solutions to reaction-diffusion systems modeling combustion
[DE83-000603] N83-31773
Rotational and irrotational freestream disturbances interacting inviscidly with a semi-infinite plate
[AD-A127009] N83-31998

TREES (MATHEMATICS)
Design Aids for Real-Time Systems (DARTS) N83-32363
Algebraic approximation of event tree sequences
[DE82-022169] N83-32452

TRIGGER CIRCUITS
A simple multifunction discriminator for multichannel triggers
[DE83-004193] N83-31981

TRIVALENT IONS
Spectroscopic properties of the f-elements in compounds and solutions
[DE83-007963] N83-31759

TROPICAL STORMS
Annual data and verification tabulation Atlantic tropical cyclones 1982
[PB83-184077] N83-32255

TROPOSPHERE
Analysis of NOAA/Alaskan MST radar data
[AD-A127023] N83-31927

TROPOSPHERIC WAVES
Global atmospheric waves: Mechanical heating of the lower thermosphere
[AD-A127222] N83-32206

TRYPTOPHAN
Psychopharmacological techniques for optimizing human performances
[AD-A128529] N83-32309

TSUNAMI WAVES
Annotated Tsunami bibliography: 1962-1976
[DE83-900003] N83-32270

TUNABLE LASERS
Topical Meeting on Laser Techniques for Extreme Ultraviolet Spectroscopy
[AD-A127044] N83-32048
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible
[AD-A128534] N83-32062

TUNING
Deconvolution of noisy transient signals: A Kalman filtering application
[DE83-030849] N83-31950

TURBINE BLADES
Aeroelasticity in turbomachine-cascades
[AD-A127709] N83-31605

TURBINE PUMPS
High speed cryogenic self-acting, shaft seals for liquid rocket turbopumps
[NASA-CR-168194] N83-32070

TURBOMACHINERY
Aeroelasticity in turbomachine-cascades
[AD-A127709] N83-31605
TURBULENCE
Influence of chamber length and equivalence ratio on flame propagation in a constant-volume duct
[DE83-002573] N83-31771
Analysis of NOAA/Alaskan MST radar data
[AD-A127023] N83-31927
Convection coefficients at building surfaces
[DE83-002572] N83-32015
Comparison of lateral and vertical diffusion in several valleys
[DE83-003570] N83-32198
TURBULENT BOUNDARY LAYER
Theoretical investigation of three-dimensional shock wave-turbulent boundary layer interactions
[AD-A127118] N83-31999
Turbulent boundary layer over a flat plate with strong stepwise heating
[DE83-001554] N83-32018
TURBULENT DIFFUSION
An effect of turbulent diffusion on the glow discharge-to-arc transition
[AD-A128553] N83-32009
Application of the ESCIMO theory to turbulent diffusion flames --- Engulfment, Stretching, Inter-diffusion and Moving Observer (ESCIMO)
[CFD/82/7] N83-32023
Use of Eulerian initial conditions in a Lagrangian model of turbulent diffusion
[DE83-003479] N83-32454
TURBULENT FLOW
Aerodynamics of airfoils subject to three-dimensional periodic gusts
[AD-A127043] N83-31581
Numerical simulation of turbulent flame and pressure development in gas explosions
[PB83-177832] N83-31790
Large-scale experiments on turbulent flame and pressure development
[PB83-177840] N83-31791
Tests of subgrid-scale models in strained turbulence. Studies of the structure of homogeneous shear flows: Developing a model of turbulence near a wall from solutions of the Navier-Stokes equation
[AD-A128282] N83-32004
Statistical mechanics of non-equilibrium processes in plasmas and gases
[AD-A128339] N83-32006
Application of the ESCIMO theory to turbulent diffusion flames --- Engulfment, Stretching, Inter-diffusion and Moving Observer (ESCIMO)
[CFD/82/7] N83-32023
TWINNING
Lath martensites in low carbon steels
[DE83-002622] N83-31839
X-ray topographic fractography of single crystals of molybdenum and niobium
[DE83-005066] N83-32642
TWO DIMENSIONAL FLOW
Wall layer structure and drag reduction: Bursting rates
[AD-A128004] N83-32003
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia N83-32482
Frequency effect of transonic flow over an oscillating airfoil N83-32486
Computation of two-dimensional, transonic, chemically reacting nonequilibrium flow in a rocket nozzle N83-32487
Lift generation due to vortex shedding N83-32488
Adiabatic compression of elongated field-reversed configurations
[DE83-003533] N83-32604
TWO PHASE FLOW
Flow of gas-particle mixtures
[AD-A127466] N83-32001
Liquid transfer and entrainment correlation for droplet-annular flow
[DE83-007703] N83-32019
Behaviour of a 6 m high thermosiphon --- cryopumps
[OUEL-1460/83] N83-32514

U

U.S.S.R.
USSR report: Earth sciences, no. 26
[JPRS-83622] N83-32121
Drilling at accesses to Earth's mantle N83-32122
USSR report: Earth sciences, no. 27
[JPRS-83829] N83-32123
Petrosyants interviewed on results of PIGAP program N83-32124
Automation of hydrophysical research N83-32125
USSR report: Science and technology policy, no. 9
[JPRS-82713] N83-32647
ULTRALOW TEMPERATURES
Some experiments in low-temperature thermometry
[DE83-004179] N83-32510
ULTRASHORT PULSED LASERS
Proposal for a new Thomson scattering technique for large fusion devices
[IPF-82-16] N83-32611
ULTRASONIC RADIATION
Scattering by flaws in a slab or a half-space
[DE83-000637] N83-32080
ULTRASONIC SCANNERS
Computerized ultrasonic scanning bridge for defect imaging: Composite materials
[DE83-001539] N83-31741
Influence of scanning variables on ultrasonic response
[DE83-003754] N83-32521
ULTRASONIC TESTS
Experience with non-destructive testing of rolled product quality at the Orsk Khalilovo Works
[BLL-M-34974-(5826.4)] N83-32076
ULTRASONICS
Advanced aluminum-lithium base alloys produced by rapid solidification from the melt
[AD-A127571] N83-31822
ULTRAVIOLET SPECTRA
The Brookhaven free-electron laser experiment
[DE83-002840] N83-32064
Suitability of a wall-stabilized arc as a transfer standard of spectral radiance in the spectral range 165 to 350 nm
[NPL-QU-65] N83-32479
Laser-induced fluorescence detection of large organic molecules
[DE83-000353] N83-32540
ULTRAVIOLET SPECTROSCOPY
Topical Meeting on Laser Techniques for Extreme Ultraviolet Spectroscopy
[AD-A127044] N83-32048
Laser-induced fluorescence detection of large organic molecules
[DE83-000353] N83-32540
UNDERGROUND STORAGE
Relationship of an in-situ test facility to a deep geologic repository for high-level nuclear waste, task 4
[DE83-901818] N83-31726
Thermal impact of waste emplacement and surface cooling associated with geologic disposal of nuclear waste
[DE83-007314] N83-32565
Nuclear-waste disposal: Technical issues and status
[DE83-002185] N83-32568
Assessment of spent-fuel waste-form/stabilizer alternatives for geologic disposal
[DE83-002458] N83-32573
Thermal-gradient migration of brine inclusions in salt crystals
[DE83-004180] N83-32633
UNDERGROUND STRUCTURES
Report on solar-neutrino experiments
[DE83-001306] N83-32543
UNDERGROUND TRANSMISSION LINES
Development of a leak location system for use on underground electric power transmission cable
[DE83-900533] N83-31983
UNDERWATER ACOUSTICS
Three-dimensional parabolic-equation-based estimation of the ocean acoustic field
[AD-A128507] N83-32520
UNDERWATER EXPLOSIONS
Preliminary investigation of aluminum combustion in air and steam
[AD-A128566] N83-31757
Impulse response of the ocean floor nonlinear techniques for measurement enhancement
[AD-A128578] N83-32269
UNIMOLECULAR STRUCTURES
Mode specificity in unimolecular reaction dynamics
[DE83-0001932] N83-32546
UNIONS (CONNECTORS)
Beam connector apparatus and assembly
[NASA-CASE-MFS-25134-1] N83-31895
UNSATURATION (CHEMISTRY)
Review of ground-water flow and transport models in the unsaturated zone
[DE83-004256] N83-32158
UNSTEADY FLOW
Investigation of convective flows in model systems of directional solidification configurations N83-31682
Analysis of steady, 2-dimensional chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique. Volume 1: Theoretical development
[AD-A127219] N83-31997
UNSTEADY STATE
Unstable phenomena in a two-phase closed thermosyphon N83-32506
URANIUM
Orientation study of northern Arkansas. National uranium resource evaluation program. Hydrogeochemical and stream-sediment reconnaissance
[DE83-001214] N83-32156
Hydrogeochemical and stream sediment reconnaissance, orientation study of central Louisiana: National uranium resource evaluation program
[DE83-001217] N83-32157
URANIUM ALLOYS
A study of the uranium-aluminum-silicon system
[DE83-002345] N83-31836
A general purpose residual stress analyzer
[AD-A127820] N83-32109
URANIUM OXIDES
Heat-transfer characteristics of dry porous particulate beds with internal heat generation --- for reactor safety considerations N83-32012
URBAN RESEARCH
Alternate fuels and energy sources for electric department: City of Tallahassee, Florida
[DE83-001694] N83-31889
UREAS
Urea-formaldehyde foam insulation
[GPO-12-485] N83-32191
USER MANUALS (COMPUTER PROGRAMS)
The TOPSY guide. Transient tunnel operating, data acquisition and processing system. User's and programmer's guides
[OUEL-1462/83] N83-31610
Flexible manufacturing system handbook. Volume 3: Buyer/user's guide
[AD-A127929] N83-31901
User's manual for training device cost model 'TRACOM'
[AD-A128355] N83-32664
User's manual for Cost Proposal Evaluation Program (CPEP)
[AD-A128356] N83-32665
USER REQUIREMENTS
A collision resolution protocol with limited channel sensing: Finitely many users
[AD-A128501] N83-31948
Generating capacity in US electric utilities: How is it used? How much is needed over the decade
[DE83-900733] N83-31990
User interface design of software tool system as a technology transfer vehicle N83-32362
The development of a programming support system for rapid prototyping
[AD-A128251] N83-32388
UTILITIES
Alternate fuels and energy sources for electric department: City of Tallahassee, Florida
[DE83-001694] N83-31889

V

V GROOVES
High voltage v-groove solar cell
[NASA-CASE-LEW-13401-2] N83-32177
VACANCIES (CRYSTAL DEFECTS)
Theoretical studies of point defects and diffusion in Nb3Sn
[DE83-005146] N83-32630
VACUUM
Internal motion in high vacuum systems
[DE83-001417] N83-31906
Localization of surface excitations and stimulated desorption
[DE83-002143] N83-32625
VACUUM CHAMBERS
Internal motion in high vacuum systems
[DE83-001417] N83-31906
Research on a new type of negative hydrogen ion source
[AD-A127947] N83-32525
VACUUM FURNACES
An automatic monoellipsoidal mirror furnace facility for long-term crystal growth on the European Retrievable Carrier (EURECA) N83-31655
Isothermal gradient heat-pipes space furnace (500 to 1000 deg C) N83-31659
VALLEYS
Comparison of lateral and vertical diffusion in several valleys
[DE83-003570] N83-32198
VALVES
Preliminary engineering study: Quick opening valve MSFC high Reynolds number wind tunnel
[NASA-CR-170845] N83-31612

VANADIUM ALLOYS
Activity of hydrogen in metal-hydrogen systems: Strontium, thorium-nitrogen and vandaium alloys
[DE83-004976] N83-31843
Hydrogen and deuterium diffusion in vanadium alloys
[DE83-004964] N83-31845
VAPOR PHASES
Synthesis of hydroxy-terminated dinitropropyl acrylate polymers and improved characterization of hydroxy-terminated prepolymers
[AD-A127469] N83-31866
Identification and cleavage of breakable single bonds by selecting oxidation, reduction and hydrolysis
[DE83-005312] N83-32624
VAPOR PRESSURE
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A127765] N83-31755
VAPORIZING
LOX/hydrocarbon fuel carbon formation and mixing data analysis
[NASA-CR-168066] N83-31886
Mathematical representation of size and electronic factors
[DE83-004182] N83-32455
Flow field visualization of vapor condensation in the enclosure N83-32504
VAPORS
Detecting monomethylhydrazine rocket fuel vapors with the MDA model 3060 autospot automatic toxic gas detector
[AD-A127512] N83-31722
Atomic-vapor-laser isotope separation
[DE83-003253] N83-32530
VARIANCE (STATISTICS)
The asymptotic variance of higher order crossings
[AD-A127459] N83-32430
VARIATIONS
On subset selection procedures for the largest mean from normal populations having a common known coefficient of variation
[AD-A127136] N83-32461
VECTOR DOMINANCE MODEL
Psi prime photoproduction at a mean energy of 150 GeV
[DE83-000686] N83-32549
VECTOR SPACES
Orthomorphisms N83-32318
The germs of diffeomorphisms and of vector fields in the class of finite differentiability N83-32338
VECTORS (MATHEMATICS)
Optimum multisensor, multitarget time delay estimation
[AD-A127639] N83-32423
VEGETATION
Hydrocarbons from plants and trees
[DE83-002228] N83-31727
VEGETATIVE INDEX
LANDSAT data preprocessing
[E83-10380] N83-32133
VELOCITY DISTRIBUTION
Exact direct-simulation-scheme for the Boltzmann equation/correlation of molecular velocities subject to renewal processes N83-32492
Relaxation of velocity distribution of electrons cooled (heated) by rotational excitation (de-excitation) of N sub 2 N83-32494
VENERA SATELLITES
Discussion of Halley's comet projects N83-31625
VENUS (PLANET)
Interaction of solar wind with magnetosphere of Venus N83-31627
Interplanetary mission designs by multiple Earth-Venus-Jupiter swingbys N83-32489
VERTICAL DISTRIBUTION
Comparison of lateral and vertical diffusion in several valleys
[DE83-003570] N83-32198
VERTICAL ORIENTATION
Advanced composite vertical stabilizer for DC-10 transport aircraft
[NASA-CR-172780] N83-31595
Analysis and calculation of macrosegregation in a casting ingot, exhibit D
[NASA-CR-170846] N83-31818
VERTICAL TAKEOFF
Aerodynamic ejectors in the UK
[BAE-KRS-N-GEN-243] N83-31594
VERY LARGE SCALE INTEGRATION
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 4: Test generation
[AD-A127985] N83-31967
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 1: Executive summary
[AD-A127984] N83-31968
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 7: Built-In Testing (BIT) and Built-In Test Equipment (BITE)
[AD-A128587] N83-31975
VIBRATION
Interior noise and vibration measurements on operational military helicopters and comparisons with various ride quality criteria
[NASA-TM-84864] N83-32518
Current analysis for rotating and vibrating heavy nuclei
[DE83-000612] N83-32637
VIBRATION EFFECTS
Oscillatory convection in a spherical cavity due to g-jitter N83-31694
Development of data-acquisition-and-analysis systems for in-beam gamma-ray spectroscopy: A study of the nucleus 180W
[DE83-004992] N83-31781
VIBRATION ISOLATORS
Vibration isolation and pressure compensation apparatus for sensitive instrumentation
[NASA-CASE-LAR-12728-1] N83-32026
VIBRATION MEASUREMENT
Vibration analysis of piston engines with application to noise control N83-32083
Finite difference methods in vibration analysis N83-32090
Dynamic applications of piezoelectric crystals. Part 1: Fundamentals N83-32091
Digital synthesis of response-design spectrum compatible earthquake records for dynamic analyses N83-32092
VINYL POLYMERS
The effect of plasticizer on the piezoelectric properties of unoriented polyvinylidene fluoride films
[AD-A127863] N83-31861
VIRUSES
Viral control of nuisance blue-green algae. Part 2: Cyanophage strains, stability studies of phages and hosts, and effects of environmental factors on phage-host interactions
[PB83-178129] N83-32200
VISCOMETERS
Prediction of pressure drop of two-phase coal slurries in pipelines
[DE83-003382] N83-32016
VISCOPLASTICITY
Application of a third-invariant plasticity theory to concrete and soils
[AD-A127079] N83-32097
VISCOSITY
Method for the preparation of polymers
[DE83-004941] N83-31880
Existence of viscosity solutions of Hamilton-Jacobi equations
[AD-A127691] N83-32421
Stable viscosity matrices for systems of conservation laws
[AD-A127759] N83-32447
VISCOUS FLOW
Computer-aided design and fabrication of molds and computer control of injection molding
[PB83-187955] N83-31914
Discretization and solution techniques for Navier-Stokes and transonic flow problems
[AD-A127944] N83-32002
VISIBILITY
Regional weather depiction plot
[PB83-194415] N83-32258
VISUAL ACUITY
Cold weather goggles. Part 5: Acceptable limits of optical distortion
[AD-A127657] N83-32315
VISUAL DISCRIMINATION
Velocity discrimination in the peripheral visual field
[AD-A127949] N83-32297
VISUAL PERCEPTION
Binocular shading and visual surface reconstruction
[AD-A127058] N83-32580
VOICE COMMUNICATION
Controlled test procedures for using intervocalic consonauts to assess speech intelligibility: A feasibility study
[AD-A127953] N83-31941
VOICE DATA PROCESSING
A theoretical model for the Speech Input Device SID3. Part 1: Filters
[NPL-DITC-20/83-PT-1] N83-31921
A theoretical model for the Speech Input Device SMD3. Part 2: Correlators
[NPL-DITC-21/83-PT-2] N83-31922
A hardware preprocessor for use in speech recognition: Speech Input Device SID3
[NPL-DITC-22/83] N83-31923
VOIDS
Influence of composition and substrate bias on structure and inert-gas content of sputter-deposited Ni-La alloys
[DE83-002716] N83-31830
Effects of irradiation on ceramics for fusion-reactor applications
[DE83-009468] N83-31872
VOLTAGE CONTROLLED OSCILLATORS
Applications of Josephson junction SQUIDs Superconducting Quantum Interference Device) and Arrays
[AD-A127135] N83-31962
VOLTAGE GENERATORS
Adaptive reference voltage generator for firing angle control of line-commutated inverters
[NASA-CASE-MFS-25215-1] N83-31953
VORTEX SHEDDING
Lift generation due to vortex shedding N83-32488
VORTICES
Scaling laws for vortex induced debris ingestion into air intakes
[BAE-KRS-N-GEN-274] N83-31575
An experimental study of pressures on 60 deg Delta wings with leading edge vortex flaps
[NASA-CR-172833] N83-31576
Explicit smooth velocity kernels for vortex methods
[AD-A127781] N83-32007

W

WAFERS
High voltage v-groove solar cell
[NASA-CASE-LEW-13401-2] N83-32177
WALL TEMPERATURE
Turbulent boundary layer over a flat plate with strong stepwise heating
[DE83-001554] N83-32018
WARHEADS
Expansion of the scan endgame program for aircraft survivability studies and development of a supporting user's guide
[AD-A127557] N83-31598
WASTE DISPOSAL
Geotechnical instrumentation requirements for at-depth testing and repository monitoring in tuff
[DE83-002188] N83-32034
Review of ground-water flow and transport models in the unsaturated zone
[DE83-004256] N83-32158
Review and evaluation of paleohydrologic methodologies
[DE83-004572] N83-32159
Survey of foreign systems for incineration and energy recovery
[AD-A127461] N83-32161
Information on ocean disposal of municipal and industrial waste
[GAO/RCED-83-161] N83-32190
Analysis of geothermal wastes for hazardous components
[PB83-188680] N83-32203
Regional low-level radioactive waste disposal sites: Progress being made but new sites will probably not be ready by 1986
[GAO/RCED-83-48] N83-32563
Corrosion resistant canisters for nuclear waste isolation
[DE83-000090] N83-32564
Thermal impact of waste emplacement and surface cooling associated with geologic disposal of nuclear waste
[DE83-007314] N83-32565
Disposal costs for SRP high-level wastes in borosilicate glass and crystalline ceramic waste forms
[DE83-003105] N83-32567
Nuclear-waste disposal: Technical issues and status
[DE83-002185] N83-32568
Systems overview of the subseabed disposal program
[DE83-000091] N83-32569
Biological intrusion barriers for large-volume waste-disposal sites
[DE83-002061] N83-32571
Environmental evaluation of alternatives for long-term management of Defense high-level radioactive wastes at the Idaho Chemical Processing Plant
[DE83-002504] N83-32572
Assessment of spent-fuel waste-form/stabilizer alternatives for geologic disposal
[DE83-002458] N83-32573
Overview assessment of nuclear-waste management
[DE83-004472] N83-32574
Relevance of biotic pathways to the long-term regulation of nuclear-waste disposal. Topical Report on reference western arid low-level sites
[DE83-002575] N83-32576

WASTE HEAT
Performance analysis of the Jersey City Total Energy Site
[PB83-185348] N83-32187
WASTE TREATMENT
Systems overview of the subseabed disposal program
[DE83-000091] N83-32569
WASTE UTILIZATION
Pacific Northwest Regional Biomass Program
[PB83-188623] N83-31893
Survey of foreign systems for incineration and energy recovery
[AD-A127461] N83-32181
Environmental evaluation of alternatives for long-term management of Defense high-level radioactive wastes at the Idaho Chemical Processing Plant
[DE83-002504] N83-32572
WASTE WATER
Anaerobic treatment of gasified effluents
[DE83-001864] N83-31786
WASTES
Solubilities of actinide solids under oxic conditions
[DE83-002675] N83-31776
WATER
Electrolyte solutions near the critical point of water: A review and proposal for studies under microgravity conditions N83-31698
Supercooled water
[AD-A127539] N83-31753
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A127765] N83-31755
Hydrogen combustion in aqueous foams
[DE83-002534] N83-31775
Effects of snow compaction on water release and sediment yield, Bridger Bowl Ski Area, Gallatin County, Montana
[PB83-186445] N83-32174
Hydrogen and oxygen from water. Part 6: Quenching the effluent from a solar furnace
[AD-A127457] N83-32182
X-ray measurements of water-fog density
[DE83-005139] N83-32243
WATER CIRCULATION
Heat transfer to water from a vertical tube bundle under natural-circulation conditions
[DE83-008459] N83-32010
WATER COLOR
Satellite Data Distribution System (SDDS). The development and demonstration of new fisheries support products based on remote ocean sensing from satellites
[E83-10399] N83-32147
WATER CONSUMPTION
Evaluation of water conservation techniques in the Upper Colorado River Basin
[PB83-175315] N83-32164
WATER FLOW
Review of ground-water flow and transport models in the unsaturated zone
[DE83-004256] N83-32158
Remote sensing determination of hydrograph recession characteristics
[PB83-186627] N83-32170
Heat transfer rate of looped type heat pipes using water and Nak as working fluid under liquid phase flow N83-32508
WATER HEATING
Design and development testing of an improved high-efficiency water heater
[DE83-006136] N83-31904
Technology for energy-efficient buildings
[DE83-005927] N83-31905
WATER INJECTION
Evaluation of the North Stanley Polymer Demonstration Project
[DE83-006915] N83-31876
WATER POLLUTION
Viral control of nuisance blue-green algae. Part 2: Cyanophage strains, stability studies of phages and hosts, and effects of environmental factors on phage-host interactions
[PB83-178129] N83-32200
Metal input and mobilization in 2 acid-stressed lake watersheds in Maine
[PB83-182022] N83-32201
WATER RESOURCES
Water conservation: An update of federal activity N83-32148
Ground-water resources of the White River Basin, Hamilton and Tipton Counties, Indiana
[PB83-184309] N83-32169
Remote sensing determination of hydrograph recession characteristics
[PB83-186627] N83-32170
Legal and administrative systems for water allocation and management: Options for change. Seven perspectives on aspects of water resource planning in the southeastern states
[PB83-187120] N83-32173
WATER RUNOFF
LANDSAT-D investigations in snow hydrology --- Sierra Nevada Mountains, California
[E83-10386] N83-32141
WATER TREATMENT
Review of corrosion inhibitors: Theory and practice
[PB83-181487] N83-31853
High efficiency ozone absorption in organically polluted water (downflow column)
[BMFT-FB-T-83-056] N83-32199
WATER VAPOR
Absorption of ethanol and water vapor by Silicalite, a hydrophobic molecular sieve
[DE83-004981] N83-31788
WATER WAVES
The elevation and duration of wave crests
[AD-A127872] N83-32259
Accurate computations for steep solitary waves
[AD-A127706] N83-32261
Integrable models of shallow water waves
[AD-A127816] N83-32263
Interaction of waves and currents
[AD-A128551] N83-32265
Estimation of wave spectra from wave height and period
[IOS-135] N83-32271
A new method for the analysis of extremes applicable to one year's data --- wave height return values
[IOS-142] N83-32272
WATERSHEDS
Improving watershed-model accuracy by using digital topography
[PB83-178137] N83-32165
Statistical analysis of the daily streamflow hydrograph and a probability distribution of the interarrival times of peak flows-application to Indiana
[PB83-187153] N83-32171
Use of remote sensing techniques and the universal soil loss equation to determine soil erosion
[PB83-182006] N83-32172
Effects of snow compaction on water release and sediment yield, Bridger Bowl Ski Area, Gallatin County, Montana
[PB83-186445] N83-32174
Metal input and mobilization in 2 acid-stressed lake watersheds in Maine
[PB83-182022] N83-32201
WAVE ATTENUATION
Deconvolution of noisy transient signals: A Kalman filtering application
[DE83-030849] N83-31950
Effects of microstructure on the speed and attenuation of elastic waves
[DE83-000671] N83-32116
Deterministic methods of seismic source identification
[AD-A127477] N83-32211
WAVE EQUATIONS
A variational approach to surface solitary waves
[AD-A127707] N83-32000
WAVE INTERACTION
Interaction of waves and currents
[AD-A128551] N83-32265
WAVE PROPAGATION
Interaction of solar wind with magnetosphere of Venus N83-31627
Residual-stress characterization by use of elastic-wave-scattering measurements
[DE83-000647] N83-31985
Analysis of laser-turbulence utilizing a video tape recorder and digital storage oscilloscope
[AD-A127859] N83-32049
Dynamic applications of piezoelectric crystals. Part 2: Theoretical studies N83-32084
Effects of microstructure on the speed and attenuation of elastic waves
[DE83-000671] N83-32116
Oceanic Pn/Sn phases: A qualitative explanation and reinterpretation of the T-phase
[AD-A128343] N83-32266
Cylindrical Bessel functions for a large range of complex arguments
[AD-A128049] N83-32428
Shock compression of single-crystal forsterite N83-32614
WAVE REFLECTION
Electromagnetic mirror dynamics
[AD-A127515] N83-31938
Cylindrical Bessel functions for a large range of complex arguments
[AD-A128049] N83-32428
WAVE SCATTERING
Scattering by flaws in a slab or a half-space
[DE83-000637] N83-32080
WAVEFORMS
Frequency response of finite-aperature sample-and-hold systems
[DE83-002279] N83-32348
WAXES
Time resolved study of primary decomposition process for nitro paraffins and nitramines
[AD-A127660] N83-31748
WEAK INTERACTIONS (FIELD THEORY)
Neutrino mixing in grand unified models
[DE83-004342] N83-32552
Topics in phenomenology of unified gauge theories of weak, electromagnetic, and strong interactions
[DE83-004241] N83-32554
WEAPON SYSTEMS
Environmental standards for electro-optical systems
[AD-A127776] N83-32588
Building and operating the logistics composite model (LCM) for new weapon systems, part A
[AD-A127538] N83-32662
WEAR
Spectrometer sensitivity investigations on the spectrometric oil analysis program
[AD-A127969] N83-31752
Design of strong, ductile, duplex low alloy steels
[DE83-002606] N83-31834
Fireproof ceramics and process for their manufacture
[DE83-005021] N83-31881
WEATHER FORECASTING
Satellite Data Distribution System (SDDS). The development and demonstration of new fisheries support products based on remote ocean sensing from satellites
[E83-10399] N83-32147
Tropical cyclone wind probability forecasting for the north Indian Ocean (WINDPIO)
[AD-A127130] N83-32233
Annual data and verification tabulation Atlantic tropical cyclones 1982
[PB83-184077] N83-32255
Regional weather depiction plot
[PB83-194415] N83-32258
WEATHER MODIFICATION
Cloud physics studies in SCPP (Sierra Cooperative Pilot Project) during 1977-82 and in Utah/1978
[PB83-161307] N83-32248
WEIGHT (MASS)
Optimality criterion methods in structural optimization
[AD-A127991] N83-32106
WEIGHT REDUCTION
Conceptual designs for 100-MW space radiators
[DE83-003542] N83-32020
WEIGHTLESSNESS
Star City astronaut training center N83-31622
Production of an aluminium-lead alloy in micro-gravity
[BLL-M-28685-(5828.4)] N83-31807
Peculiarities in formation of Arabidopsis Thaliana (L.) Heynh, generative organs under space flight conditions
[NASA-TM-77263] N83-32277
WEIGHTLESSNESS SIMULATION
Japanese program review of material processing in space N83-31640
WELD STRENGTH
Review of factors affecting microstructure and toughness in simulated heat-affected zones of structural steels
[PB83-180208] N83-31851
WELDABILITY
Development of ferritic weldments for grain-refined ferritic steels for 4.2K service
[DE83-009059] N83-32072
WELDED JOINTS
The behaviour of welded high strength grain-refined steels under cathodic stress corrosion cracking conditions
[BLL-RISLEY-TR-4741-(9091.9F)] N83-31802
WELDED STRUCTURES
Effects of high heat input welding of construction steels A36, A514, and A516
[AD-A127083] N83-31820
WELDING
Research on hot cracking in weld metal by melting-solidification heat cycle simulator
[PB83-178921] N83-32075
Weld-cracking mechanisms in austenitic stainless steels
[DE83-001157] N83-32111
WELLS
Wellborne inertial navigation system
[DE83-004012] N83-31593
WEST GERMANY
Terminal forecast reference notebook for Ramstein AB, Germany
[AD-A128319] N83-32240

WETLANDS
Evaluation of spatial, radiometric and spectral thematic mapper performance for coastal studies
[E83-10386] N83-32139
WETTING
Metallic composite materials and microgravity
N83-31641
Implications of the lack of wetting at the monotectic growth front --- in space N83-31680
WHEAT
The water factor in harvest-sprouting of hard red spring wheat
[E83-10376] N83-32129
Rain-induced spring wheat harvest losses
[E83-10377] N83-32130
Comparison of CRD, APU, and state models for Iowa corn and soybeans and North Dakota barley and spring wheat
[E83-10379] N83-32132
WHITE NOISE
Evaluating the detectability of Gaussian stochastic signals by steepest-descent integration
[AD-A127604] N83-32419
WIGGLER MAGNETS
Research progress and forecast report for MSNW FEL oscillator program
[AD-A127786] N83-32061
WIND (METEOROLOGY)
Analysis of NOAA/Alaskan MST radar data
[AD-A127023] N83-31927
WIND DIRECTION
Near-surface meteorological conditions associated with active resuspension of dust by wind erosion
[DE83-006272] N83-32247
WIND EFFECTS
Near-surface meteorological conditions associated with active resuspension of dust by wind erosion
[DE83-006272] N83-32247
Wind effects on longitudinal dispersion in open-channel flows
[PB83-179697] N83-32251
WIND PRESSURE
Wind effects on longitudinal dispersion in open-channel flows
[PB83-179697] N83-32251
WIND PROFILES
Wind effects on longitudinal dispersion in open-channel flows
[PB83-179697] N83-32251
WIND TUNNEL STABILITY TESTS
Wind tunnel experiments on the divergence of swept wings with composite structures
[AD-A127950] N83-31582
WIND TUNNEL TESTS
An experimental study of pressures on 60 deg Delta wings with leading edge vortex flaps
[NASA-CR-172833] N83-31576
Wind-tunnel investigation of leading-edge thrust on arrow wings in supersonic flow
[NASA-TP-2167] N83-31577
The TOPSY guide. Transient tunnel operating, data acquisition and processing system. User's and programmer's guides
[OUEL-1462/83] N83-31610
Preliminary engineering study: Quick opening valve MSFC high Reynolds number wind tunnel
[NASA-CR-170845] N83-31612
Universal microcomputer interface for data acquisition
[AD-A127875] N83-32346
WIND TUNNELS
Air Force Academy Aeronautics Digest, Spring/Summer 1982
[AD-A128248] N83-31571
WIND TURBINES
Project demonstration of wind turbine electricity: Interconnecting a northern Michigan fruit farm with a major utility
[DE83-001387] N83-31984
Indirect solar wind geothermal: Alternative energy sources 4, volume 4
[LC-82-71533] N83-32179
WIND VELOCITY
Comparison of lateral and vertical diffusion in several valleys
[DE83-003570] N83-32198
Wind effects on longitudinal dispersion in open-channel flows
[PB83-179697] N83-32251
WINDMILLS (WINDPOWERED MACHINES)
Project demonstration of wind turbine electricity: Interconnecting a northern Michigan fruit farm with a major utility
[DE83-001387] N83-31984
WINDPOWER UTILIZATION
Project demonstration of wind turbine electricity: Interconnecting a northern Michigan fruit farm with a major utility
[DE83-001387] N83-31984
Indirect solar wind geothermal: Alternative energy sources 4, volume 4
[LC-82-71533] N83-32179
WINGS
Contribution to the aerodynamic study of wings and propellers
[NASA-TM-77083] N83-31579
New considerations on scale extrapolation of wing pressure distributions affected by transonic shock-induced separations
[NASA-CR-166426] N83-31597
WIRE
Millimeter microwave emission by use of plasma produced electrons orbiting a positively-charged wire
[AD-A127240] N83-32046
WORDS (LANGUAGE)
A post-processing algorithm for time domain pitch trackers
[AD-A127671] N83-31934

X

X RAY DIFFRACTION
X-ray diffraction analysis of Nb-3Ge and NbGe alloys
[NASA-CR-170831] N83-31744
Influence of composition and substrate bias on structure and inert-gas content of sputter-deposited Ni-La alloys
[DE83-002716] N83-31830
The measurement of X-ray residual stress in textured cubic materials
[AD-A127822] N83-32620
X RAY SCATTERING
High-resolution X-ray scattering
[DE83-004599] N83-32592
X RAY SPECTRA
Nonthermal ultrasoft X-ray spectra on ZT-40M
[DE83-007123] N83-32534
X RAYS
X-ray measurements of water-fog density
[DE83-005139] N83-32243
Beta and low-energy photon irradiation of several commercial phosphors
[DE83-006606] N83-32531
Transition radiation: A possible diagnostic tool for relativistic electrons at Sandia
[DE83-006844] N83-32533
Nonthermal ultrasoft X-ray spectra on ZT-40M
[DE83-007123] N83-32534
Thermonuclear model for high energy transients --- X-ray and gamma ray bursts
[DE83-002814] N83-32566

Y

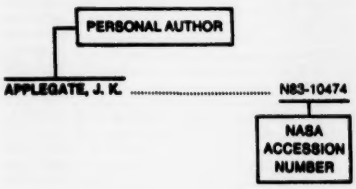
YANG-MILLS THEORY
Why QCD lattice theory is important to spin physicists
[DE83-003955] N83-32638
YIELD
Relationship between manufacturing yields and field failure rates of electronic equipment
[AD-A128498] N83-32078
Rain-induced spring wheat harvest losses
[E83-10377] N83-32130
Comparison of CRD, APU, and state models for Iowa corn and soybeans and North Dakota barley and spring wheat
[E83-10379] N83-32132
YTTRIUM
Structure of multi-layer spherical crystals of graphite in cast iron
[BLL-M-35028-(5828.4)] N83-32613
YTTRIUM COMPOUNDS
Structural reliability of yttria-doped, hot-pressed silicon nitride at elevated temperatures
[AD-A127583] N83-31862

Z

ZEEMAN EFFECT
Laser-plasma interaction experiments and diagnostics at NRL (Naval Research Laboratory)
[AD-A128254] N83-32060
Generation of enhanced-scalelength plasmas and Zeeman study of magnetic fields
[AD-A127951] N83-32596
ZETA PINCH
ZAPP: Z-pinch atomic physics program
[DE83-005390] N83-32606
ZINC ALLOYS
Ostwald ripening and solidification behavior of near monotectic ZN-PB alloys N83-31646
ZINC SULFIDES
Semiconductor electrodes. Part 51: Efficient electroluminescence at ZnS electrode in aqueous electrolytes
[AD-A127454] N83-31966

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

ABBOTT, A. T. N83-32161
ABD-EL-RAHAM, O. E. N83-32393
ABRAMS, R. N83-32547
ACKER, L. A. N83-32202
ACKERMAN, B. N83-32236
ADAMS, J. H., JR. N83-32703
ADLER, R. J. N83-31976
N83-32523
AGNEW, C. E. N83-32657
AHRENS, J. P. N83-32259
AHRENS, T. J. N83-32614
AIME, M. N83-31880
AKESSON, T. N83-32539
AKSELSEN, O. M. N83-31851
AKULINTSEVA, T. E. N83-31801
ALBERI, J. L. N83-31987
ALBROW, M. G. N83-32539
ALEKSANDROV, V. K. N83-31806
ALESSO, H. P. N83-32451
ALEXEFF, I. N83-32046
ALI, B. N83-32090
ALLARDYCE, L. B. N83-31935
ALLEN, G. N83-32608
ALLEN, L. H., JR. N83-32163
ALLINGER, J. N83-32512
ALMEHED, S. N83-32539
ALT, H. W. N83-32458
ALTMAYER, E. N83-32015
N83-32017
AMANZHOLOV, Z. K. N83-31805
AMIROV, M. G. N83-31813
AMON, D. M. N83-31984
ANDERSON, C. M. N83-32341
ANDERSON, R. R. N83-32226
ANGELIS, A. L. S. N83-32538
ANGELL, C. A. N83-31753
ARBEL, A. N83-32308
ARCHAMBEAU, C. B. N83-32211
ARENDS, M. N83-31571
ARETI, H. N83-31951
ARIHOOD, L. D. N83-32169
ARQUITT, A. B. N83-31793
ARTMAN, D. H., JR. N83-31613
ATASSI, H. N83-31581
AUSTIN, W. W. N83-32133
N83-32134
AVERILL, R. D. N83-32026
AVERY, W. H. N83-32185
AWERBUCH, J. N83-31737
AYRES, D. J. N83-32114

B

BABUSKA, I. N83-32096
N83-32439
N83-32440
BADIE, A. N83-32105
BADO, P. N83-32058
N83-32586
BAER, D. R. N83-31784
BAER, M. R. N83-31775
BAER, R. N. N83-32520
BAHDER, G. N83-31989
BAILEY, A. J. N83-31602
BAILEY, C. A. N83-32514
BAILEY, D. G. N83-31602
BAILEY, F. R. N83-32397
BAILEY, J. C. N83-32027
BAILEY, R. A. N83-31819
BAINES, N. C. N83-31610
BAKER, A. L. N83-32039
BALACHANDRAN, N. K. N83-32205
BALASANMUGAM, K. N83-31746
BALES, K. S. N83-32095
BALLENTINE, C. N83-32281
BALLHAUS, W. F., JR. N83-32397
BALTAY, C. N83-32551
BANKS, W. W. N83-31979
BANNISTER, P. R. N83-31930
N83-31942
BAR-SHALOM, Y. N83-32423
BARAN, H. A. N83-31573
BARBER, G. C. N83-31823
BARBOSA, M. N. N83-32127
BARBOSA, M. P. N83-32138
BARD, A. J. N83-31863
N83-31966
BARMATZ, M. B. N83-32515
N83-32516
BARMIN, I. V. N83-31701
BARNES-FARRELL, J. L. N83-32310
BARON, M. J. N83-32220
BARR, S. N83-32198
BARTA, C. N83-31649
BARTHOLOMEW, J. N83-31912
BARTLETT, C. M. N83-31939
BASILI, V. R. N83-32358
N83-32359
BASS, B. R. N83-32112
BASU, S. N83-32209
BATALI, J. N83-32399
BATEMAN, G. N83-32598
BATLEY, R. N83-32539
BATT, J. R. N83-32387
N83-32408
BAUER, A. N83-32129
N83-32130
BAUHOF, F. N83-31726
BAUMAN, F. N83-32015
N83-32017
BEALE, J. T. N83-32007
BEAUCHAMP, E. D. N83-32687
BEAUCHAMP, E. K. N83-31742
BEDARIDA, F. N83-31660
BEEZHOL, W. N83-32533
BEHRMANN, P. N83-31654
BEHROOZI, F. N83-32623
BEIER, W. N83-31663
BEITLER, R. S. N83-31603
BEITZ, J. V. N83-31759
BELL, J. M. N83-32658
BELLOWS, R. N83-31769
BELOKUROVA, I. N. N83-31688
BEMENT, L. J. N83-31596
BEN-TAL, A. N83-32462
BENARY, O. N83-32539
BENDER, L. U. N83-32128
N83-32136
BENEDICK, W. B. N83-31761
BENENSON, G. N83-32561
BENNETT, G. W. N83-31603
N83-32591
BENTLEY, J. L. N83-32376
BENZ, R. N83-31654
BER, V. I. N83-32088
BERDNIKOV, V. I. N83-31817
BERENSTEIN, C. A. N83-32334
BERESTYCKI, H. N83-31773
BERGER, M. D. N83-32278
BERGER, M. J. N83-32562
BERKOWITZ, R. L. N83-32661
BERLAD, A. L. N83-31666
BERLINRUT, D. D. N83-31754
BERNSHTEIN, M. L. N83-31796
BERTEL, E. N83-32527
BERTKE, R. S. N83-31606
N83-31738
BESCH, H. J. N83-32536
BEWERSDORFF, A. N83-31643
BEYERLE, A. N83-32037
BEYSENS, D. N83-31695
BHAT, M. N83-32674
BHOWMICK, A. K. N83-31857
BIAZ-BOSSIO, L. M. N83-31780
BIEFELD, R. M. N83-32634
BIEGEL, J. D. N83-32146
BIEHL, K. N83-31604
BIGGERS, R. A. N83-31756
BILL, R. C. N83-31855
BILLIA, B. N83-31681
BILLINGS, J. N83-32664
BILOW, N. N83-31724
BINKLEY, M. N83-32549
BIRD, R. G. N83-31615
BIRD, W. A. N83-32022
BIRON, D. G. N83-32053
BIZAIS, Y. N83-32591
BLACHERE, J. R. N83-31873
BLACK, A. L. N83-32129
N83-32130
BLACKMAN, H. S. N83-31979
BLAGOV, V. N83-31620
BLAIR, M. N83-31582
BLAIWES, A. S. N83-31615
BLAKKE, J. R. N83-32025
BLEWETT, J. P. N83-32570
BLICK, D. W. N83-32282
BLOCHER, A. H., III N83-32377
BLOOMFIELD, P. N83-32456
BLUCK, R. M. N83-31733
BLUM, A. S. N83-32348
BLUMENFELD, B. J. N83-32538
BOCCACCI, P. N83-31660
BODNARCHUK, V. I. N83-32085
BODYAKOV, A. I. N83-32076
BOENIG, H. J. N83-31986
BOGGILD, H. N83-32539
BOGGY, R. N83-32058
BOHN, M. N83-32015
BOISVERT, R. F. N83-31686
BONILLA, M. G. N83-32222
BOOTH, M. N83-31852
N83-31913
BORE, C. L. N83-31575
N83-31594
BORGNAKKE, C. N83-31767
BORIS, J. P. N83-32697
BOROVIKOVA, T. N83-32653
BOTNER, O. N83-32539
BOTWIN, R. N83-32609
BOUTETDEMONVEL, L. N83-32329
BOVAIR, S. N83-32305
BOWEN, J. N83-32058
BOX, G. E. P. N83-32470
BOYD, D. N83-31741
BOYKO, R. G. N83-32295
BRADLEY, E. R. N83-31831
BRADLEY, P. F. N83-31636
BRADY, J. V. N83-32306
BRAEDT, M. N83-31663
BRAEUCHLE, C. N83-32032
BRAILE, L. W. N83-32218
BRANCH, M. C. N83-32001
BRANDT, J. N83-32246
BREHOB, D. D. N83-32073
BREUER, M. A. N83-31967
N83-31968
N83-31971
N83-31975
BREUS, T. N83-31627
BREWER, L. N83-32455
BRICE, L. N83-32390
BRILEY, R. P. N83-31580
BRILL, A. B. N83-32591
BRINCKMAN, F. E. N83-31789

BRION, M. N83-32330
BRITCHER, R. N. N83-32366
BRODSKY, S. J. N83-32555
BRODY, H. N83-32539
BRONISZ, S. E. N83-32575
BROPHY, J. J. N83-31870
BROUGH, W. N83-32246
BROUSAIDES, F. J. N83-32238
BROUSE, C. N83-32665
BROWN, B. N83-32547
BROWN, G. S. N83-32592
BROWN, M. N83-32463
BROWN, R. M. N83-32152
BROWN, W. B., JR. N83-32346
BROWN, W. C. N83-32160
BROWN, W. S. N83-32276
BROWNING, B. N83-32246
BRUEMMER, S. M. N83-31784
BRUSH, L. H. N83-32569
BRYAN, R. H. N83-32112
BRYSON, J. W. N83-32112
BUCHANAN, B. G. N83-31961
BUCHANAN, H. L. N83-32536
BUCKLAND, D. E. N83-32366
BUIUM, A. N83-32339
BULL, R. A. N83-31863
BUNNER, D. L. N83-32269
BURCH, N. R. N83-32278
BURCHAM, R. E. N83-32070
BURFORD, R. P. N83-31858
BURGER, C. F. N83-32237
BURGESS, D. R. N83-31878
BURGOYNE, R. E. N83-31614
BURKERT, V. N83-32539
BURLAND, D. M. N83-32032
BURNS, T. N83-32150
BURNSIDE, W. D. N83-31931
BURTON, B. W. N83-32574
BURTON, W. D., JR. N83-32278
BURYLEV, B. P. N83-31816
BUSHNELL, D. N83-32115
N83-32118
BUTLER, J. N83-32549
BUTLER, M. K. N83-32391
BYKOV, A. A. N83-31800

C

CADWELL, L. L. N83-32576
CAHILL, J. F. N83-31597
CALLAHAN, P. N83-32549
CALVIN, M. N83-31727
CAMBON, G. N83-31659
CAMEL, D. N83-31683
CAMILLERI, L. N83-32538
CAMP, A. L. N83-32243
CAMPBELL, J. H. N83-32567
CAMPBELL, P. G. N83-31884
CAMPBELL, P. L. N83-31724
CAMPBELL, R. B. N83-32609
CAMPBELL, S. A. N83-32623
CANDELORE, N. R. N83-32351
CANDY, J. V. N83-31950
CAPEHART, B. L. N83-32347
CAPELLA, L. N83-31681
CARD, D. N83-32371
CARGO, D. N83-31824
CARHART, H. W. N83-31587
CARLAN, A. J. N83-31967
N83-31968
N83-31971
N83-31975
CARLBERG, T. N83-31690
CARLSON, A. B. N83-31713
CARLSON, D. L. N83-32314
CARLSON, G. A. N83-32609
CARLSON, J. B. N83-31781
CARNALL, W. T. N83-31759
CARPENTER, R. C. N83-31949
CARPENTER, T. J. N83-32609
CARROLL, A. N83-32512
CARSON-HENRY, C. N83-32150
N83-32151
CARTER, D. J. T. N83-32271
CARTIER, P. N83-32329
CASKEY, G. R., JR. N83-31844
CASPI, S. N83-32513
CASTILLO, J. L. N83-31674
CAVAGE, W. N83-31604
CAVENY, L. H. N83-31756
CAVIN, O. B. N83-31838
CECCHI, J. L. N83-31829
CERVEAU, D. N83-32337
CHAI, A. T. N83-32177
CHALLENOR, P. G. N83-32272
CHAMBERS, R. E. N83-31885
CHAN, C. N83-32024
CHANAN, G. A. N83-32691
CHANDRASEKARAN, N. N83-31823
CHANG, C. P. N83-32239
CHANG, J. C. N83-31793
CHAPIN, T. J. N83-32538
CHAPMAN, D. L. N83-32166
CHAPMAN, D. R. N83-32004
CHAPMAN, E. A. N83-31924
CHARNES, A. N83-32476
CHASE, W. G. N83-32307
CHAU, L. L. N83-32561
CHELYSHEV, N. A. N83-32086
CHEN, L. D. N83-31915
CHEN, P. C. T. N83-32099
CHEN, T. S. N83-31723
CHENG, C. F. N83-32152
CHENG, C. H. N83-31723
CHENG, S. N83-32449
CHENG, S. S. N83-31786
CHERNOV, P. P. N83-32087
CHERNOVOL, A. V. N83-32613
CHERNYAYEVA, I. I. N83-32277
CHESHCHEVIK, E. R. N83-31995
CHIAN, E. S. K. N83-31786
CHIDA, K. N83-31956
CHIEN, R. T. N83-32401
CHILDS, J. M. N83-32303
CHO, W. D. N83-31847
CHOTAI, A. N83-31991
N83-32459
CHRIEN, R. E. N83-32559
CHUN, C. H. N83-31670
CHURCH, V. N83-32355
CIOFFI, S. O. N83-32308
CIPPERLY, G. E. N83-32694
CLANCY, P. F. N83-31652
CLAPP, G. W. J. N83-31729
CLARK, B. A. N83-32457
CLARK, G. B. N83-32255
CLARK, J. D. N83-31710
CLARK, N. A. N83-32617
CLARK, R. K. N83-32081
CLARKE, D. R. N83-31860
CLARKE, J. N83-32629
CLARKE, R. N. N83-31955
CLARKSON, I. R. N83-32609
CLEVENSON, S. A. N83-32518
CLICK, W. N83-31739
CLINE, J. F. N83-32571
COBB, D. D. N83-32039
COCHRAN, M. P. N83-32225
COHEN, C. N83-31914
COLGATE, S. A. N83-32704
COLINDEVERDIERE, Y. N83-32329
COLTMAN, J. W. N83-31589
COLVIN, R. D. N83-32052
COMBI, M. R. N83-32696
COMPERE, A. L. N83-31891
COMPTON, R. N. N83-32544
COMSTOCK, W. J. N83-32448
CONETTI, S. N83-31951
CONNELL, J. N83-32390
CONNOR, J. H., JR. N83-32049
CONROY, J. N83-32378
COOK, K. V. N83-32521
COOK, R. N83-31877
COOL, R. L. N83-32538
CORIELL, S. R. N83-31686
CORNELL, C. A. N83-32215
COSTA, S. R. X. N83-32137
COUDURIER, L. N83-31684
COUNCE, R. M. N83-31777
COX, B. N83-31951
COX, D. D. N83-32466
COX, R. L. N83-31632
COX, W. E. N83-32173
CRABTREE, G. W. N83-32621
N83-32623
CRAGIN, J. H. N83-32262
CRAVEN, S. M. N83-32068
CREMERS, D. A. N83-32036
CRESPO, A. N83-31644
CRITZ, M. R. N83-32383
CROMP, R. F. N83-32402
CROSS, W. H. N83-31786
CROSSWHITE, H. N83-31759
CRUTCHLEY, R. J. N83-31751
CUGINI, J. N83-32395
CUMALAT, J. N83-32549
CUMERLATO, C. L. N83-32226
CUMINGS, N. P. N83-32690
CUMMINGS, J. C. N83-31761
CUNDY, D. F. N83-31588
CURTIS, S. B. N83-32283
CUSTER, S. G. N83-32174
CUYT, A. A. M. N83-32472

D

DA-RIVA, I. N83-31638
N83-31677
DADFAR, M. B. N83-32341
DAGENHART, W. K. N83-32035
DALE, B. J. N83-32387
DALEY, D. J. N83-32438
DALEY, R. N83-32256
DANBY, G. N83-32512
DANEN, W. C. N83-32540
DANIEL, B. R. N83-31721
DART, J. O. N83-32249
DAUT, D. C. N83-31943
DAVIS, H. E. N83-32666
DAVIS, J. H. N83-31744
DAVIS, J. I. N83-32530
DAVIS, R., JR. N83-32543
DAWSON, L. R. N83-31977
N83-32640
DEADMORE, D. L. N83-31795
DEBOOR, C. N83-32412
DECARLO, R. N83-31960
DECKER, L. J. N83-32057
DECKER, W. N83-32370
DECOOK, K. J. N83-32167
DEHNER, J. L. N83-32033
DEI, D. E. N83-32351
DEIERLING, B. N83-31848
DEJONG, G. N83-32401
DEJONGE, E. N83-32319
DEJONGH, J. N83-31571
DELABEAUJARDIERE, O. N83-32220
DELANG, J. N83-32665
DELGRANDE, N. K. N83-32224
DELGUERRA, A. N83-32590
DELLEUR, J. W. N83-32171
DELORGE, J. O. N83-32279
N83-32280
DELPAPA, C. N83-32538
DEPAGTER, B. N83-32323
DERBY, B. N83-31680
DERMER, O. C. N83-31793
DEROME, J. N83-32256
DERUYTTERE, A. N83-31641
DESCH, M. D. N83-32695
DESJARDINS, P. R. N83-32200
DESRE, P. N83-31684
DETMAN, R. F. N83-31894
DEVENSKI, P. N83-32547
DEVITO, B. N83-32512
DEVORE, C. R. N83-32697
DEWAR, M. J. S. N83-32524
DEWILDE, M. A. N83-32057
DIBENEDETTO, E. N83-32422
DICIACCIO, A. N83-32539
DICK, R. J. N83-31939
DIDIERJEAN, A. N83-32340
DIENES, G. J. N83-32630
DIETZ, A. G. N83-31885
DILELLA, L. N83-32538
DIMCOVSKI, Z. N83-32538
DIMITRELIS, D. N83-32645
DIPOFI, M. N83-32287
DIVER, R. B. N83-32182
DOEKMECI, M. C. N83-32084
N83-32091
DOERING, D. L. N83-32527
DOESBURG, J. M. N83-32159
DOGLIANI, H. O. N83-32545
DOLLAND, C. R. N83-31953
DOMANY, E. N83-31985
N83-32116
DONATELLI, D. A. N83-31576
DONG, B. N83-32270
DORY, R. A. N83-32597
DOWNING, R. N83-32389
DOWNS, G. T. N83-31601
DOYEL, E. R. N83-31793
DOYLE, B. L. N83-32641
DOYLE, P. T. N83-32014
DOZIER, J. N83-32135
N83-32141
N83-32144
DRAPER, S. N83-32365
DRAZOVICH, R. N83-32583
DREYFUSS, P. N83-31867
DROEMER, D. W. N83-32596
DRUGER, S. D. N83-32529
DUARTE, V. N83-32137
DUFRANE, K. F. N83-32069
DUMORTIER, F. N83-32336

DUNEGAN, H. C. N83-31881
DUNN-RANKIN, D. N83-31771
DUNN, D. A. N83-32657
DUPUY, C. N83-32058
DUPUY, C. G. N83-32586
DURANCHENKO, A. M. N83-31701
DURRAN, D. A. N83-32047
DWIGHT, A. E. N83-31836
DWYER, J. F. N83-31583
DYKSTRA, J. D. N83-32140

E

EAKIN, D. E. N83-31893
EASTER, R. C. N83-32195
EATON, R. N83-31989
EBER, L. E. N83-32675
EBERHARDT, L. E. N83-32576
ECKER, A. N83-31689
ECKHOFF, R. K. N83-31792
EDELSTEIN, A. S. N83-32621
EDEN, J. G. N83-32062
EDINGTON, R. J. N83-31747
EDSON, W. A. N83-31945
EDWARDS, B. E. N83-32053
EDWARDS, C. L. W. N83-31713
EDWARDS, T. V. N83-31939
EFIMOV, A. A. N83-31813
EHRENBERG, J. E. N83-32466
EHRENSTROM, W. A. N83-31609
EINZIGER, R. E. N83-32573
EL-NEWEIHI, E. N83-32469
N83-32471
ELCHERIF, Y. S. N83-31958
N83-31959
ELI, R. N. N83-32165
ELKOURAYCHI, A. N83-31645
ELLEMAN, D. D. N83-31896
N83-32515
ELTHON, T. E. N83-32284
EMIN, D. N83-32625
N83-32626
EMURIAN, H. H. N83-32306
ENDRES, G. W. R. N83-32532
ENDSLEY, R. N83-31988
ENNS, J. B. N83-31859
EPSTEIN, M. N83-31768
ERICSSON, K. A. N83-32307
ERTHAL, G. J. N83-32126
ESCADA, J. B., JR. N83-32127
ESLINGER, S. N83-32355
ETORI, K. N83-32502
N83-32503
EUSTATHOPOULOS, N. N83-31684
EVANS, J. C. N83-32177
EVANS, J. V. N83-32220
EVANS, K. C. N83-31919
EVANS, L. C. N83-32445
EVERETT, J. R. N83-32140
EVERETT, S. J. N83-31945
EWING, C. L. N83-32278
EYUBOGLU, V. M. N83-31943
EZAKI, T. N83-31956

F

FABER, D. E. N83-32029
FACKLAM, R. L. N83-32054
FAETH, G. M. N83-31915
FAIRCHILD, P. D. N83-32021
FAIRFIELD, D. H. N83-32595
FALCONE, N. N83-32136
FALKON, V. I. N83-31813
FALLER, T. H. N83-32226
FAN, F. R. N83-31863
N83-31966
FANG, J. N83-31686
FANG, Q. T. N83-31686
FANOUS, F. S. N83-32100
N83-32119
FARLEY, D. T. N83-31927
FARMER, L. D. N83-32268
FARMER, R. N83-32270
FARRELL, J. A. N83-32545
FAUSKE, H. K. N83-31768
FAVERO, J. L. N83-32311
FAVIER, J. J. N83-31683
FAY, W. M. N83-32157
FEDERER, W. T. N83-32433
FEIGENBAUM, E. A. N83-31961
FEIK, R. A. N83-31585
FERZIGER, J. H. N83-32004
FEUILLEBOIS, F. N83-31645
FIELDS, D. L. N83-32351
FIFE, P. C. N83-31772
N83-31774
FINDENEGG, G. H. N83-31697
FINDLER, N. V. N83-32402
FINKEL, A. N83-32263
FINLY, R. J. N83-32230
FIORELLA, M. N83-32395
FISCHER, R. N83-32184
FISCHMEISTER, H. N83-31646
FISHER, J. T. N83-31936
FISHER, P. W. N83-32011
FISHER, R. R. N83-32702
FISHWICK, P. A. N83-32352
FIX, J. J. N83-32531
FLANAGAN, P. F. N83-31636
FLATHER, R. A. N83-32273
FLECKENSTEIN, V. N83-32074
FLETCHER, E. A. N83-31749
N83-32182
FOCKE, W. W. N83-31794
FOGLE, W. E. N83-32510
FOHLEN, G. M. N83-31854
FOLEY, M. G. N83-32159
FONSHTEIN, N. M. N83-31813
FONTANA, J. J. N83-31912
FOO, Y. K. N83-32404
FORREST, R. N. N83-32441
FORTUNA, E. N83-32332
FOURNY, J. P. N83-31598
FOWLER, P. H. N83-31972
FOWLER, R. H. N83-32597
FRANCESCONI, R. P. N83-32294
N83-32299
FRANCIS, E. J. N83-32185
FRANK, J. M. N83-31906
FRANKLIN, D. R. N83-32164
FRANSSON, T. H. N83-31605
FRAZIER, L. B. N83-31793
FREDRIKSSON, H. N83-31648
N83-31687
FREEMAN, A. J. N83-31745
FREI, M. R. N83-32281
FRENCH, B. A. N83-31944
FRENCH, V. N83-32132
FRIEDMAN, R. N. N83-32281
FRISCHAT, G. H. N83-31663
FRITZ, I. J. N83-32640
FROMM, E. O. N83-32113
FROUNFELKER, R. N83-32181
FROYEN, L. N83-31641
FU-TIAN, L. N83-32479
FU, B. I. N83-31675
FUHRE, K. N83-32024
FUJIMOTO, T. N83-32499
FUJIWARA, T. N83-32484
FUQUA, M. N83-32378
FURGAL, D. T. N83-31980

G

GAABO, R. J. N83-31602
GABRIELSON, T. N83-32269
GADGIL, A. N83-32015
N83-32017
GAFFNEY, J. E. N83-32368
GAINES, I. N83-32549
GALBIATI, M. N83-32332
GAMBLE, R. B. N83-31925
N83-31926
GARCIA, C. J. N83-32702
GARDNER, W. A. N83-31963
GARRETT, S. G. N83-31868
GARRISON, C. F., JR. N83-31887
GARTHWAITE, F. G. L. N83-31920
GAST, R. C. N83-32351
GATES, R. N83-31726
GATTI, E. N83-31978
GAZZARA, C. P. N83-32109
N83-32620
GE, G. N83-32463
GEANANGEL, R. A. N83-32628
GEARHART, R. A. N83-31951
GEE, G. K. N83-32296
GEER, J. N83-32341
GELLATLY, R. A. N83-32408
GELLES, S. H. N83-31685
GELLIN, S. N83-32387
N83-32408
GENOVA, F. N83-32695
GENT, A. N. N83-31856
N83-31857
N83-31867
GENT, M. R. N83-31990
GENTRY, D. W. N83-32219
GEORGE, G. L. N83-31940
GEORGE, T. F. N83-32059
N83-32529
GEORGIOPOULOS, M. N83-31948
GEORGIYEV, O. N83-31629
GERSTMANN, J. N83-31904
GETMAN, D. L. N83-31979
GHERSINI, G. N83-31692
GIABBAI, M. N83-31786
GIANTS, T. W. N83-31724
GILBERT, W. S. N83-32513
GILL, S. P. N83-31758
GILLE, W. H., JR. N83-32677
GILLHAM, J. K. N83-31859
GILLIES, D. C. N83-32162
GILMORE, C. M. N83-31825
GIOVANOLA, J. H. N83-32101
GLADDING, G. N83-32549
GLICKSMAN, M. E. N83-31686
GLYNN, P. W. N83-32444
GODBILLON, C. N83-32329
GOEL, A. L. N83-32359
GOERLER, G. N83-31699
GOGUEN, J. N83-32361
GOLANY, B. N83-32476
GOLDBERG, H. N83-32547
GOLDMAN, R. F. N83-32296
N83-32300
GOLDSTEIN, J. A. N83-31924
GOLDSTON, R. J. N83-32605
GOLDSTONE, P. D. N83-32608
GOLIA, C. N83-31673
GOLOVANENKO, S. A. N83-31813
GONANO, L. N83-31726
GONFALONE, A. N83-31651
GOOGIN, J. M. N83-31891
GORADIA, C. P. N83-32177
GORDON, H. N83-32551
GORELIK, S. S. N83-31799
GORMAN, W. M. N83-32477
GORMLEY, M. N83-32549
GOSSET, J. N83-31658
GOULDING, F. S. N83-31782
GOURLEY, P. L. N83-32634
GOVOROV, A. A. N83-31803
GOW, A. J. N83-32262
GRADY, T. R. N83-32174
GRAEWE, E. N83-31611
GRAHAM, R. A. N83-31742
GRANT, E. R. N83-31748
GRANT, J. T. N83-32615
GRANT, N. J. N83-31822
GRAVES, R. M. N83-32212
GRAY, S. K. N83-31766
GREEN, A. E. S. N83-32231
GREEN, G. A. N83-32013
GREEN, J. A. N83-32267
GREIMANN, L. F. N83-32119
GRIBKOVSKIY, V. P. N83-32654
GRIEM, H. R. N83-32596
GRIFFIN, G. R. N83-32304
GRIFFITH, W. L. N83-31891
GRIFFITHS, S. K. N83-31775
GRIGORYAN, G. V. N83-32076
GRIMES, P. N83-31769
GRIMSON, W. E. L. N83-32580
GRINGAUZ, K. N83-31627
GRINGORTEN, I. I. N83-32237
GRITZKE, A. R. N83-32260
GROBLER, J. J. N83-32317
GROENEWOLD, G. H. N83-32168
GROENIER, W. S. N83-31777
GROLMES, M. A. N83-31768
GRONEMEYER, S. N83-32547
GROSS, M. K. N83-32302
GROSSKOPF, W. G. N83-32259
GROSSMAN, W. N83-32061
GROVES, G. V. N83-32206
GROVESTON, P. K. N83-32400
GRUGNI, G. N83-31692
GRUN, J. N83-32060
GRUSZCZYSNKI, M. J. N83-32010
GUBAREV, V. N83-31624
GUBERNATIS, J. E. N83-31985
N83-32116
GUBSER, J. L. N83-31580
GUENTHER, P. T. N83-32537
GUNDERSEN, A. N83-32689
GUNNER, H. B. N83-32204
GUNZBURGER, M. D. N83-32006
GUPTA, A. D. N83-32108
GUPTA, S. S. N83-32461
GURAP, C. N83-32024
GURLAND, J. N83-31828
GUSWA, J. H. N83-32162
GUTBROD, H. H. N83-32556
GUTHRIE, M. P. N83-32668

GUTSCHICK, V. P. N83-32574
GUYENNE, T. D. N83-31637

H

HADFIELD, J. R. N83-32687
HAGGERTY, H. N83-32547
HAGMANN, E. L. N83-32203
HAHNE, A. N83-31662
HAINES, P. A. N83-32234
HAKONSON, T. E. N83-32571
HALBACH, K. N83-32511
HALBIG, J. K. N83-32038
HALDEA, P. N83-32669
HALE, G. N83-31951
HALES, J. M. N83-32195
HALL, P. N83-32438
HALLENBECK, A. E., JR. N83-31757
HALLER, E. E. N83-32632
HALLIWELL, C. N83-32547
HAMILTON, J. R. N83-32677
HAMMARLING, S. J. N83-32405
HAMMER, J. M. N83-32056
HANDS, B. A. N83-32514
HANDS, E. B. N83-32416
HANLEY, J. T. N83-32581
HANNIGAN, R. L. N83-32560
HANSEN, P. N83-32644
HANSEN, W. L. N83-32632
HARAGUCHI, S. N83-32503
HARDING, D. N83-32549
HARDY, K. A. N83-32282
HARFORD, A., JR. N83-32036
HARNAR, R. R. N83-32560
HARPER, S. R. N83-31786
HARPOLE, K. J. N83-31876
HARRIS, M. N83-31965
HARRIS, R. D. N83-32214
HARRIS, S. E. N83-32509
HARTE, J. N83-32197
HARTNESS, J. N83-31739
HARTON, E. E., JR. N83-32661
HARVEY, G. A. N83-32028
HARVEY, J. F. N83-32031
HARVEY, K. L. N83-32697
HASSENZAHL, W. N83-32513
HASTINGS, J. B. N83-32550
HATCHER, R. D. N83-32630
HATTORI, H. N83-32508
HAUENSTEIN, D. E. N83-32635
HAUSFELD, B. A. N83-32181
HAYASHI, A. K. N83-32484
HAYASHI, M. N83-32485
HAYES, J. V. N83-32245
HEBBLE, T. L. N83-31777
HECKER, S. S. N83-31840
HEDAYAT, A. S. N83-32433
HEGER, F. J. N83-31885
HEIDE, W. N83-31652
HEIDENRICH, G. A. N83-31925
N83-31926
HEIMBURG, K. F. N83-32163
HEINMETS, F. N83-32281
HEITMANN, H. N83-32644
HELFAND, D. J. N83-32691
HELSTROM, C. W. N83-32419
HELYEPO, B. O. N83-32125
HENAGER, C. H., JR. N83-31831
HENNEQUIN, J. C. N83-31658
HENNESSY, J. N83-31961
HENNING, C. D. N83-32609
HENRY, D. N83-31661
HENRY, M. W. N83-31636
HENSIEK, B. N83-32246
HERBELIN, J. M. N83-32047
HERBRECHTSMEIER, P. N83-32199
HERBST, M. J. N83-32060
N83-32596
HERBST, M. K. N83-31601
HERCULES, D. M. N83-31746
HERRO, H. M. N83-31845
HESSLER, B. H. N83-31824
HEYNICK, L. N. N83-31945
N83-32293
HIEBER, C. A. N83-31914
HIGGINS, A. M. N83-31571
HILL, C. J. N83-31876
HILL, F. B. N83-31783
HILL, R. K. N83-31938
HILTON, A. R. N83-32616
HIMES, D. A. N83-32573
HINKS, D. G. N83-32623
HINSHAW, J. C. N83-31869
HIRSCH, K. N83-32610
N83-32611
HIRSCHON, A. S. N83-32624
HITCHCOCK, J. T. N83-32012
HIVELY, L. M. N83-32597
HJERTAGER, B. H. N83-31790
N83-31791
N83-32024
N83-32025
HMELO, A. B. N83-32642
HODES, E. N83-31807
HODGES, D. B. N83-32699
HODGIN, C. R. N83-32247
HOELLIG, K. N83-32412
N83-32413
HOFF, D. C. N83-32422
HOFFMAN, J. D. N83-31997
HOGAN, J. T. N83-32535
HOLBROOK, K. L. N83-32531
HOLLAND, D. M. P. N83-32033
HOLLAND, W. D. N83-31777
HOLLEBEEK, R. J. N83-32538
HOLLENBAUGH, D. D. N83-32518
HOLLERBACH, J. M. N83-32313
HOLM, D. D. N83-32603
HONMA, H. N83-32075
HOOVER, W. G. N83-32558
HORTON, J. A. N83-31838
HOSODA, K. N83-31875
HOUGHTON, R. C., JR. N83-32349
HOUSE, K. W. N83-31744
HOUSTON, P. L. N83-32051
HOWARD, J. L. N83-31793
HREZO, M. S. N83-32173
HSU, C. C. N83-31584
HSUE, S. T. N83-32039
HUBBART, J. E. N83-31721
HUBER, W. C. N83-32163
HUGHES, T. P. N83-32523
HUIJSER, P. H. N83-31696
HUIJSMANS, C. B. N83-32316
N83-32318
HULL, K. N83-32037
HULL, R. J. N83-32053
HUMPHREY, R. G. N83-32588
HUNDHAUSEN, A. J. N83-32700
HUNT, J. N83-31637
HUNTER, J. K. N83-32261
HUNTER, T. O. N83-32568
HURLEY, C. W. N83-32187
HUTZLER, W. P. N83-31574
N83-32667
HYMAN, E. N83-32005

I

IKEGAMI, Y. N83-31656
ILGEN, D. R. N83-32311
ILYUKHIN, V. N83-31649
IMAI, K. N83-31909
IMAM, M. A. N83-31825
INGELS, E. M. N83-32344
INSLEY, P. A. N83-31574
N83-32667
INTEMANN, P. R. N83-32021
ISAYEV, A. I. N83-31914
ISHI, M. N83-32019
ITO, F. N83-31910

J

JACKSON, J. N83-32512
JACKSON, J. Z. N83-31793
JACOBI, N. N83-32515
JAGODA, J. I. N83-31721
JAHN, R. N83-32628
JAIN, A. N83-31918
JAMIN-CHANGEART, F. N83-31658
N83-31659
JANAEN, G. N83-32612
JANSEN, H. N83-32608
JANSEN, R. N83-31650
JARRELL, J. D. N83-32233
JAUCHEM, J. R. N83-32281
JENG, S. M. N83-31915
JENKINS, J. C. N83-31754
JENKINS, R. K. N83-31724
JENKINS, W. F. N83-32045
JENNE, E. A. N83-32155
JENNINGS, P. C. N83-32215
JENNISON, D. R. N83-32625
JENSEN, J. G. N83-32234
JENSEN, S. W. N83-32394
JINZHANG, B. N83-32669
JOHANNESEN, R. B. N83-31789
JOHANSON, W. R. N83-32621
JOHNSON, D. M. N83-32249
JOHNSON, E. G. N83-32351
JOHNSON, L. C. N83-32309
JOHNSON, R. H., II N83-32260
JOHNSON, R. R. N83-31733
JOHNSON, W. C. N83-32188
JOHNSON, W. L. N83-32365
JOHNSTON, M. F. N83-31919
JONES, E. E. N83-32078
JONES, H. D., JR. N83-32688
JONES, H. M. N83-32093
JONES, O. D. N83-32136
JONES, R. H. N83-31784
JONES, V. J. N83-32120
JONSSON, I. G. N83-32265
JORGENSEN, B. N83-32628
JOYCE, J. W. N83-31740
JUBIN, R. T. N83-31777
JUMPER, E. J. N83-31571
JUNG, K. Y. N83-31943
JUNG, V. N83-31848

K

KAASHOEK, M. A. N83-32316
N83-32320
KACENJAR, S. T. N83-32060
KAELBLE, D. H. N83-31864
N83-31865
KAHL, J. S. N83-32201
KAHN, M. M. S. N83-31597
KAILASANATH, K. N83-32005
KAISER, M. L. N83-32695
KALLATH, T. N83-31961
KALVINSKAS, J. J. N83-31743
KAMMERUD, R. C. N83-32015
N83-32017
KAMONTAGNE, R. A. N83-31587
KANAMORI, H. N83-32215
KANAZAWA, Y. N83-31910
KANEKO, M. N83-32504
KANEVSKIY, Z. N83-32124
KANG, Y. S. N83-32554
KANNEL, J. W. N83-32069
KAPETANAKOS, C. A. N83-32526
KAPPAUF, T. N83-32182
KAPUTKINA, L. M. N83-31796
KARL, R. N83-31848
KATO, S. N83-32499
KATO, T. N83-32104
KATONA, M. G. N83-32217
KATZ, C. N83-31989
KATZ, R. H. N83-32374
KAUFFMAN, R. E. N83-31752
KAVOUSSI, S. N83-31592
KAVVAS, M. L. N83-32171
KAWATA, S. N83-32482
KAY, E. A. N83-32161
KAY, I. W. N83-32587
KAYSER, E. G. N83-31596
KEARLEY, S. J. N83-31992
N83-32043
KECK, F. L. N83-31731
KEDEM, B. N83-32430
KEELIN, T. W. N83-31990
KEILSON, J. N83-32403
N83-32474
KEITH, S. J. N83-32167
KELLER, J. L. N83-32234
KELLEY, C. M. N83-32308
KELLEY, M. C. N83-31927
KELLY, J. E. N83-32012
KELSEY, J. R. N83-31593
KEMPF, J. M. N83-31571
KENNEDY, W. E., JR. N83-32576
KENNELLY, R. A., JR. N83-31578
KERELIUK, S. N83-31608
KERRICK, W. E. N83-32351
KERTON, I. M. N83-32031
KETCHUM, R. D., JR. N83-32268
KEY, P. J. N83-32479
KEYUN, R. N83-32585
KHOT, N. S. N83-32106
KHROMOV, V. G. N83-31808
KIELSON, J. N83-32435
KIERAS, D. E. N83-32305
KILE, J. N. N83-32581
KIM, C. S. N83-31866
KIM, H. J. N83-32072
KIM, R. N83-31739
KIPP, G. W. N83-31599
KIUTTU, G. F. N83-32523
KLEIN, G. N83-31882
KLEIN, H. N83-31642
KLEIN, K. N83-31989

KLEIN, S. M. N83-31788
KLEMAS, V. N83-32139
KLETT, R. D. N83-32569
KLOSTER, K. N83-32253
N83-32254
KLOSTERBUER, S. F. N83-32038
KNAEBEL, K. S. N83-31783
KNEISSEL, A. N83-31646
KNICKERBOCKER, S. H. N83-32117
KNIGHT, D. D. N83-31999
KNIZE, R. J. N83-31829
KNOLL, R. W. N83-31830
KNYSTAUTAS, R. N83-32024
KOBAYASHI, Y. N83-32504
KOCH, C. C. N83-31838
KOENIG, M. N83-31739
KOERNER, R. M. N83-31911
KOHL, W. H. N83-32342
KOHSE, G. E. N83-31827
KOIKE, S. N83-32336
KOIZUMI, H. N83-32507
KOJIMA, T. N83-31850
KOLIGMAN, M. B. N83-31939
KOMM, R. N83-32628
KONOVLOVA, N. N. N83-31812
KOOSIS, P. N83-32333
KORDYUM, Y. L. N83-32277
KOSMAHL, H. G. N83-31952
KOSTKOWSKI, H. J. N83-32231
KOSTROUN, V. O. N83-32550
KOTS, Y. F. N83-31808
KOURA, K. N83-32494
N83-32500
KOVACS, A. N83-32262
KOZLOV, A. N. N83-31806
KRAMER, D. P. N83-32068
KRINSKY, S. N83-32064
KRIVOSH, S. M. N83-31805
KRUPKA, K. M. N83-32155
KUAN, D. N83-32583
KUEHN, L. N83-32160
KUGIMIYA, K. N83-31762
KUHN, G. N83-31908
KUHN, G. D. N83-32004
KUMAGAI, S. N83-31665
KUNG, H. T. N83-32434
KUNZ, J. N83-32637
KUPERSCHMIDT, B. A. N83-32603
KUPKA, I. N83-32329
KUREPINA, V. V. N83-32613
KURTH, W. S. N83-32695
KUWAHARA, S. N83-31910
KVINGE, T. N83-32275
KWOK, M. A. N83-32047

L

LAGACE, P. A. N83-31735
LAHN, T. G. N83-31602
LAKE, R. B. N83-32674
LAM, K. S. N83-32059
LAMOREAUX, C. H. N83-32161
LANDIS, D. A. N83-31782
LANDSBERGER, B. J. N83-31734
LANGBEIN, D. N83-31652
N83-31694
LAPINSKI, T. N83-31969
LAPPA, D. A. N83-32451
LARSEN, M. F. N83-31927
LARSON, J. C. N83-31602
LASEK, A. N83-31645
LATIMER, P. J. N83-32521
LAUE, E. G. N83-32232
LAWRENCE, A. J. N83-32437
LAZARETH, O. W., JR. N83-32630
LEATHERWOOD, J. D. N83-32518
LEBRUN, P. N83-31951
LECSCHEUX, A. N83-32695
LEE, E. H. N83-32098
LEE, H. J. N83-31835
LEE, J. H. N83-31957
N83-32024
LEE, J. R. N83-32533
LEE, J. T. N83-32453
N83-32454
LEEMPOEL, P. N83-31866
LEES, M. I. N83-31852
N83-31913
LEGROS, J. C. N83-31668
N83-31669
LEHMBERG, R. H. N83-32050
LEHMKUKL, H. N83-31797
LEI, K. S. N83-32619
LEIDICH, D. N83-32184
LEIGH, I. C. N83-32094
LENTNER, K. J. N83-32042
LENTZ, J. M. N83-32290
LEONARD, T. N83-32464
LEONHARDT, W. N83-32512
LESNY, D. N83-32389
LETAW, J. R. N83-32703
LEUCHTE, W. N83-31797
LEVER, A. B. P. N83-31751
LEVINSON, H. J. N83-31765
LEVITT, K. N. N83-32361
LEVY, P. W. N83-31778
LEWIS, M. B. N83-32006
LEWIS, P. A. W. N83-32437
LIANG, R. Y. N83-32619
LIEPA, V. V. N83-31974
LIEPINS, R. N83-32628
LIKENS, W. C. N83-32145
LILEEV, A. S. N83-31804
LILJENDAHL, M. N83-31690
LILWALL, R. C. N83-32227
LIMBOURG-FONTAINE, M. C. N83-31668
N83-31669
LIN, P. M. N83-31958
N83-31959
LIND, M. D. N83-31664
LINDBERG, R. E., JR. N83-31720
LINFORD, R. K. N83-32604
LIPKIN, J. N83-32569
LIPPOLD, J. C. N83-32111
LISAGOR, W. B. N83-32081
LITTLE, E. M. N83-32534
LIU, C. T. N83-31838
LIU, Y. K. N83-32024
LIVORNESE, L. L. N83-31877
LO, P. S. N83-32369
N83-32371
LOEHMAN, R. E. N83-31742
LOEHNER, H. N83-32556
LOGAN, B. G. N83-32609
LOGEL, J. D. N83-32226
LOPEZ, B. N83-32037
LOPEZ, F. N83-32547
LORD, A. E., JR. N83-31911
LORENZ, R. O. N83-31570
LOU, X. C. N83-32417
LOVELESS, R. L. N83-32549
LOVETT, G. M. N83-32244
LOWRY, M. E. N83-31842
LU, F. N83-31786
LU, W. N83-32055
LUCCIO, A. N83-32064
LUCHIK, T. S. N83-32003
LUCKHAUS, S. N83-32456
LUDLAM, T. N83-32561
LUI, Y. F. N83-31929
LULY, M. H. N83-31879
LUM, K. N83-31608
LURIA, S. M. N83-32315
LUSKUS, L. J. N83-31722
LUXEMBURG, W. A. J. N83-32316
N83-32321
LYNCH, V. E. N83-32597
LYON, J. F. N83-32597

M

MACARTHUR, C. D. N83-32234
MACDONALD, D. D. N83-32619
MACK, E. J. N83-32581
MACK, R. J. N83-31577
MACKENZIE, E. N83-32209
MADDEN, N. W. N83-31782
MADDOX, L. B. N83-32035
MADEY, T. E. N83-32527
MADOR, I. N83-31725
MADSEN, N. K. N83-31949
MAEZAWA, S. N83-32505
MAGNANI, N. J. N83-32564
MAIER, M. R. N83-31981
MAJDA, A. J. N83-32007
N83-32447
MAJKRZAK, C. F. N83-32041
MAKSIHOV, A. B. N83-31809
MALAKHOV, M. V. N83-31728
MALAMUD, E. N83-32547
MALGRANGE, B. N83-32329
N83-32329
MALHOTRA, P. K. N83-32548
MALLETT, R. L. N83-32098
MALMEJAC, Y. N83-31639
MANGASARIAN, O. L. N83-32414
MANGOLD, D. C. N83-32565
MANHART, R. L. N83-31709
MANKA, C. K. N83-32596
MANN, J. B. N83-31759
MANNA, Z. N83-32373
MANNING, D. R. N83-31921
N83-31922
N83-31923
MANUEL, F. N83-31644
MAR, J. W. N83-31735
MARCHMAN, J. F., III N83-31576
MARCUE, N. C. N83-31815
MARCUS, G. D. N83-31948
MARCUS, H. L. N83-31736
MARCUS, S. N83-32053
MARITZ, P. N83-32322
MARKAKIS, J. N83-32037
MARKIN, K. N83-31591
MARKOWICH, P. L. N83-32425
MARKS, T., JR. N83-32039
MARKWORTH, A. J. N83-31685
MARSH, N. A. N83-32274
MARTIN, H. L. N83-32379
MARTIN, J. K. N83-31767
MARTINET, J. N83-32329
MARTINEZ, I. N83-31679
MARTINIDES, H. N83-31651
MARTINSON, G. V. N83-31798
MARWITZ, J. D. N83-32248
MASCARENHAS, N. D. D. N83-32126
MASON, J. P. N83-32428
MASSON, L. S. N83-32602
MATHIS, K. R. N83-31943
MATOGAWA, Y. N83-32490
MATSUI, K. N83-31850
MATSUMOTO, T. N83-32504
MATSUO, H. N83-32490
MATTAR, F. P. N83-32584
MATTHEWS, J. E. N83-32267
MAYERNIK, G. E. N83-32372
MAYO, F. R. N83-32624
MAZARAKIS, M. G. N83-31976
MAZUMDAR, M. N83-32079
MAZUR, P. O. N83-31951
MAZUR, V. L. N83-32087
MAZZOLA, J. B. N83-32478
MCCABE, L. P. N83-31844
MCCARLEY, R. E. N83-31821
N83-31841
MCCLANAHAN, E. D. N83-31830
MCCLUNG, J. D. N83-31760
MCCLUNG, R. W. N83-32521
MCCONNELL, P. N83-32113
MCCOY, W. F. N83-32478
MCCULLOUGH, E. J. N83-32202
MCDONALD, W. N83-31741
MCEVILLY, T. V. N83-32215
MCGARRY, F. E. N83-32355
N83-32357
N83-32369
N83-32370
MCHATTON, R. C. N83-31779
MCINTOSH, W. R. N83-32690
MCKEE, S. P. N83-32297
MCKENZIE, D. H. N83-32576
MCLEAN, E. A. N83-32060
N83-32596
MCMASTERS, O. D. N83-32621
MCMILLAN, O. J. N83-32004
MCNALLY, K. C. N83-32215
MCNEIL, L. E. N83-32631
MCNICHOLS, G. R. N83-31574
MCPHERSON, R. S. N83-32602
MEINDL, J. T. N83-31961
MELESHKO, V. I. N83-32087
MELLER, E. N83-32118
MENARD, M. N83-31579
MENDONCA, F. J. N83-32137
MENUSHENKOV, V. P. N83-31804
MERCIER, M. T. N83-32557
MERGENTHALER, A. M. N83-32251
MERKLE, J. G. N83-32112
MERRIMAN, T. L. N83-32069
MERWARTH, P. N83-32355
N83-32370
MERZ, R. N83-31793
MESEGUER, J. N83-31678
METTEE, M. F. N83-32202
MEYER, B. N83-32396
MEYER, R. E. N83-32442
MICHELS, A. C. N83-31696
MIDDLETON, V. E. N83-31586
MIGACHEVA, G. N. N83-31606
MIKAMI, H. N83-32501
MIKHEYEV, M. N83-32651
MIKKELSEN, D. R. N83-32600
MILEY, G. H. N83-32607
MILLER, E. N83-31755
N83-31919
MILLER, J. C. N83-32544

MILLER, R. B. N83-31976
MILLEVILLE, M. N83-32184
MILSTED, M. G. N83-32083
MILYAEVA, E. V. N83-31811
MINICUCCI, D. D. N83-32203
MINOR, E. E. N83-31980
MINOTT, P. O. N83-32577
MINSTER, J. B. N83-32210
MINSTER, O. N83-31684
MISHIMA, K. N83-32019
MIYAMOTO, I. N83-32362
MIZIN, V. G. N83-31817
MOBLEY, C. E. N83-31685
MODDEMAN, W. E. N83-32068
MODESTINO, J. W. N83-31939
N83-31943
MOIR, R. W. N83-32609
MOLENKAMP, C. R. N83-32242
MOLNAR, P. H. N83-32215
MONCTON, D. E. N83-32592
MONTAGNE, J. N83-32174
MONTI, R. N83-31672
MORGAN, T. H. N83-31705
MORI, E. N83-31656
MORI, N. N83-32075
MORIYA, M. N83-31875
MORIYA, T. N83-32498
MOROSIN, B. N83-31742
MOROZOV, V. A. N83-32086
MORPHY, D. D. N83-32071
MORRIS, A. S. N83-32460
MORRIS, C. L., JR. N83-32347
MORRIS, E. N83-32289
MORRIS, J. F. N83-32175
MORRISSEY, L. A. N83-32150
MORTIMER, V. D., JR. N83-31916
MOSEL, U. N83-32637
MOSKO, J. D. N83-32304
MOUROU, G. N83-32586
MUELLER, G. N83-31682
MULKO, G. N. N83-32076
MULLAN, D. J. N83-32701
MULLER, J. N83-32429
MUNTNER, M. S. N83-31824
MURAKAMI, H. N83-32481
N83-32483
MURATA, I. N83-31910
MURPHY, D. L. N83-31588
MURTHY, V. K. N83-32409
MUSTAIN, J. L. N83-31903
MYKLEBUST, J. N83-32278

N

NAEHLE, R. N83-31642
NAGAHATA, M. N83-32485
NAGLE-ESHLEMAN, J. N83-32082
N83-32089
NAKAHASHI, K. N83-32487
NAKAJIMA, A. N83-32497
NAKATA, T. N83-31880
NAKATANI, I. N83-32491
NANBU, K. N83-32492
N83-32493
NANSTEEL, M. N83-32017
NAPOLITANO, L. G. N83-31638
N83-31672
N83-31673
NARAYANACHARYULU, P. B. V. N83-31837
NARAYANAN, R. N83-32164
NASH, L. N83-31588
NEEF, W. S. N83-32609
NEGISHI, K. N83-32506
NEIL, C. C. N83-32056
NEIN, M. E. N83-32690
NELSON, R. A. N83-31632
NELSON, S. O. N83-31843
NELSON, W. R. N83-32590
NETTLETON, D. H. N83-32479
NEUMANN, G. N83-31682
NEUTS, M. F. N83-32475
NEWCOMB, J. N83-31604
NEWMAN, B. A. N83-31861
NG, L. C. N83-32423
NG, T. T. N83-32018
NGHI, N. T. N83-31702
N83-31703
NICHOLS, J. P. N83-32668
NICHOLS, R. L. N83-31712
NICOLAENKO, B. N83-31772
N83-31773
N83-31774
NICOLAIDES, R. A. N83-32002
NIELSEN, K. F. N83-31664
NIEMANN, E. N83-32184
NINGO, A. Y. N83-31943
NISHIDA, M. N83-32497
NIU, K. N83-32481
N83-32482
N83-32483
NOHEL, J. A. N83-32413
NORRIS, W. P. N83-31888
NORTH, E. D. N83-31777
NORTON, D. C. N83-32250
NORTON, P. T. N83-31793
NOZUE, T. N83-32490
NYE, A. H. N83-32698

O

OATMAN, E. N. N83-31990
OBA, K. N83-31978
OBATA, K. N83-31770
OBENSCHAIN, S. P. N83-32050
N83-32596
OBRIEN, T. C. N83-32285
OCONE, D. N83-32427
OGRADY, W. E. N83-31787
OGUENKO, V. N. N83-32085
OKADA, T. N83-32483
OKITOMO, A. N83-31910
OKUMURA, M. N83-31909
OKUSHIMA, H. N83-32503
OLIGIN-NESTEROV, V. N83-32648
OLSON, G. B. N83-32200
ONEIL, P. E. N83-32202
ONO, K. N83-32486
ORAVA, R. N83-32548
ORTALE, C. N83-32037
OSADCHII, A. K. N83-31806
OSHIMA, K. N83-32480
N83-32488
OSHIMA, Y. N83-32488
OSMER, S. R. N83-31588
OSSI, P. M. N83-31691
OSTER, C. A. N83-32158
OSTRACH, S. N83-31675
OSTRAND, T. J. N83-32364
OTTO, G. H. N83-31647
OUCHI, S. N83-32335
OUIMETTE, D. N83-31982
OVCHAROV, V. P. N83-31814
OWENS, A. J. N83-32701
OWENS, D. H. N83-31991
N83-32393
N83-32459
OYUNBILLING, L. N83-31701

P

PAGE, J. N83-32355
N83-32369
PAIAO, L. B. F. C. N83-32137
PAICE, D. A. N83-31986
PAIGE, F. E. N83-32561
PALIKARIS, A. E. N83-32154
PALMER, L. B. N83-32520
PANDOLF, K. B. N83-32294
N83-32298
N83-32299
PANOV, V. S. N83-31808
PAPANTONI-KAZAKOS, P. N83-31948
PARADA, N. D. J. N83-32126
N83-32127
N83-32137
N83-32138
PARARAS-CARAYANNIS, G. N83-32270
PARK, C. S. N83-32110
PARK, J. H. N83-32028
PARKER, J. A. N83-31854
PARKS, E. J. N83-31789
PARLETT, B. N. N83-32381
PARR, A. C. N83-32033
PARZEN, E. N83-32467
PASCHALL, R. N. N83-31607
PAULIN, M. J. N83-32165
PAYLORE, P. N83-32167
PAYNE, J. R. N83-32308
PAYNE, R. C. N83-32517
PEARCE, K. R. N83-32073
PEARSON, J. M. N83-32078
PEDERSEM, B. M. N83-32695
PEDERSON, S. N83-32182
PEGGS, G. N. N83-32094
PEGO, R. N83-32447
PELLEGRINI, C. N83-32064
PELOQUIN, R. A. N83-32576
PENDLETON, J. D. N83-32063
PENG, Y. K. M. N83-32597
PEOPLES, J. N83-32549
PEPPER, W. H. N83-32588
PERALA, R. A. N83-31926
PERALES, J. M. N83-31676
PERCIVAL, C. M. N83-32569
PEREGRINE, D. H. N83-32265
PERELMAN, L. D. N83-31809
PEREZ-BLANCO, H. N83-32022
PEREZ-MENDEZ, V. N83-32590
PERKINS, B. A. N83-32574
PERKINS, J. S. N83-32520
PERONA, J. J. N83-32011
PERRICONE, B. T. N83-32358
PERRIERDELABATHIE, R. N83-31658
PERRIN, J. S. N83-32113
PETERSEN, R. J. N83-31979
PETERSON, E. M. N83-31602
PETERSON, V. L. N83-32397
PETERSON, W. M. N83-32168
PETLEY, D. H. N83-31713
PETRE, G. N83-31668
N83-31669
PETRENKO, V. N83-31621
N83-31625
PETRONDAS, D. N83-32435
PETSCHEK, A. G. N83-32704
PETTIT, F. S. N83-31873
PFEFFERKORN, P. N83-31646
PHILANDER, H. N83-32263
PHILLIPS, C. W. N83-32187
PICHMAUS, E. N83-32074
PIERCE, S. R. N83-31945
PIMENTAL, N. A. N83-32298
PIORO, T. N. N83-31614
PLATNER, E. D. N83-32561
PLOGMANN, H. N83-32160
PLUZHNIKOV, V. B. N83-31973
PODGASKII, M. S. N83-31809
PODOLSKI, W. F. N83-31760
PODWYSOCKI, M. H. N83-32128
N83-32136
POENARU, V. N83-32329
POGGI, A. N83-31751
POHLAND, F. G. N83-31786
POIRIER, D. R. N83-31818
POKROVSKIY, A. N83-31623
POLSON, P. N83-32293
POLUBOYARINOVA, V. G. N83-32076
POLYANSKII, A. F. N83-31728
POMELNIKOVA, A. S. N83-31803
PONTIGGIA, C. N83-31660
POPENOE, C. H. N83-32231
POPOVA, I. A. N83-31799
PORAT, D. N83-31982
PORTER, D. L. N83-31672
PORTNOFF, M. R. N83-32392
POSKANZER, A. M. N83-32556
POSTLETHWAITE, I. N83-32404
POUKEY, J. W. N83-31976
POUND, B. G. N83-32619
POZHIDAEV, Y. V. N83-31816
PRAG, A. B. N83-32216
PRAIZEY, J. P. N83-31657
PRASSINOS, P. G. N83-31761
PRAUSNITZ, J. M. N83-32645
PRENGER, F. C. N83-32020
PRESCON, E. L. N83-32668
PRICE, E. W. N83-31721
PROCTOR, R. N83-32273
PRODELL, A. N83-32512
PRODIUS, I. N83-32649
PROKOSHKIN, S. D. N83-31796
PRONIN, L. A. N83-32085
PROPHET, W. W. N83-32303
PROTOPOPESCU, S. D. N83-32561
PROVODENKO, O. P. N83-31726
PULAT, P. S. N83-32379
PULFORD, C. T. R. N83-31657
PURINGTON, C. M., JR. N83-32659

Q

QUIGLEY, G. P. N83-32036
N83-32540
QUIMBY, D. C. N83-32061
QUINN, F. H. N83-32250
QUINN, J. W. N83-32048
QUINN, K. M. N83-32660

R

RABIN, U. H. N83-31590
RABINOWITZ, P. H. N83-32446
RACHMATOV, O. I. N83-31703

RADUGINA, L. A. N83-32086
RADZIEMSKI, L. J. N83-32036
RAI, D. N83-31776
RAJNAK, K. N83-31759
RAJU, S. N83-32044
RALL, L. B. N83-32472
RAMAMOORTHY, C. V. N83-32398
RANDALL, L. S. N83-31935
RAO, C. R. N83-32429
RAPISARDA, L. N83-31980
RAPP, P. N83-32547
RAUKHAMAN, M. R. N83-31688
RAYNOR, G. S. N83-32245
REBBI, C. N83-32638
N83-32639
REBROV, M. N83-31619
N83-31626
RECHEN, J. N83-32513
REDDY, G. B. N83-32114
REED, G. N83-32430
REED, I. S. N83-32432
REED, K. N83-32606
REGEL, L. L. N83-31700
N83-31701
N83-31702
N83-31703
REHAK, P. N83-31978
N83-32561
REHM, B. W. N83-32168
REICHEL, L. N83-32420
REINERS, W. A. N83-32244
REISLER, H. N83-32528
RENGER, R. E. N83-31923
RENNER, T. N83-32556
RESHOTKO, E. N83-31998
REYNOLDS, C. L. N83-32574
RHEINBOLDT, W. C. N83-32096
RHINE, W. E. N83-31752
RICE, R. W. N83-31754
RICH, M. N83-31739
RICHARDS, D. N83-32185
N83-32185
RICHARDS, E. R., JR. N83-32662
RICHARDS, P. G. N83-32215
RICHARDS, P. L. N83-31765
RICHARDSON, A. J. N83-32131
RICHARDSON, D. J. N83-32028
RICHTER, J. N83-31662
RICKARD, W. H. N83-32571
RIEDESEL, H. N83-32556
RIEMENSCHNEIDER, S. N83-32412
RIGHI, E. N83-32287
RINGHOFER, C. A. N83-32425
N83-32426
RIPIN, B. H. N83-32060
RITENOUR, B. N83-32246
RITTER, H. G. N83-32556
RITZ, T. A. N83-32183
RIVAS, D. N83-31678
ROBBEN, F. N83-32018
ROBERTI, R. N83-31691
ROBERTO, J. B. N83-32601
ROBERTS, F. N83-32073
ROBERTSON, P. L. N83-32532
ROBERTSON, S. J. N83-31996
ROCHE, L. F. N83-32520
ROCK, K. A. N83-32702
RODERICK, W. E. B. N83-31608
RODGERS, D. L. N83-31602
RODGERS, J. C. N83-32574
RODRIGUEZ, R. N83-32315
ROEHR, H. N83-32610
ROGERS, S. R. N83-31928
ROGLER, H. L. N83-31998
ROGOVSKII, A. G. N83-31801
ROHATGI, N. K. N83-31743
ROMANOVA, E. M. N83-31812
ROME, J. A. N83-32597
RONE, K. Y. N83-32367
ROOF, E. F. N83-32153
ROOPCHAND, B. N83-31824
ROSENBAUM, P. R. N83-32473
ROSENBLATT, D. H. N83-31764
ROSENFELD, A. H. N83-31905
ROSSITTO, F. N83-31691
N83-31692
ROUSSARIE, R. N83-32338
ROUX, B. N83-31661
ROWAN, L. N83-32128
ROWE, R. W. N83-32591
ROZSA, R. B. N83-32567
RUANE, L. M. N83-32434
RUBIN, D. B. N83-32473
RUDD, T. J. N83-32661
RUDEV, A. N83-31631
RUE, H. D. N83-31570
RUSSO, G. N83-31672
RUSSO, P. A. N83-32039
RUUD, A. L. N83-32689
RYABCHIKOV, I. V. N83-31617
RYAN, J. D. N83-32187
RYAN, T. N83-31951
RYERSON, F. J. N83-31860
RYLAND, W. E. N83-32134
RYZHONKOV, D. I. N83-32085
RZHEGAK, B. N83-31610

S

SABA, C. S. N83-31752
SABOL, B. N83-32523
SACKS, I. J. N83-32451
SADANA, D. K. N83-32627
SAHM, P. R. N83-31639
N83-31650
N83-31689
SAITO, M. N83-31656
SAITO, S. N83-32075
SAITO, T. N83-31909
SAKURAI, A. N83-32485
SALAMA, K. N83-31823
SALISBURY, J. N83-32128
SALTZBERG, B. N83-32278
SALZMANN, H. N83-32610
N83-32611
SANCES, A., JR. N83-32278
SANDER, R. K. N83-32036
SANFELD, A. N83-31681
SANFORD, T. W. L. N83-32533
SANGHVI, S. M. N83-32016
SANTIAGO, J. M. N83-32108
SANTOS, J. J. N83-32183
SANZ, A. N83-31678
SAPORTA, L. N83-31925
N83-31926
SARIKAYA, M. N83-31832
N83-31839
SAUCIER, W. J. N83-32252
SAUNDERS, R. D. N83-32231
SAVAGE, R. T. N83-31601
SAWAOKA, A. N83-31640
SAWKA, M. N. N83-32294
N83-32298
N83-32299
SAWYER, R. F. N83-31771
N83-32073
SAXMAN, A. N83-32608
SCARBROUGH, J. O. N83-31838
SCARPELLI, G. N83-31917
SCHAEFER, H. N83-32199
SCHAEFER, H. H. N83-32324
SCHARF, W. N83-31928
SCHARMANN, A. N83-31671
SCHAWER, J. N83-31653
SCHEINBEIM, J. I. N83-31861
SCHEP, A. R. N83-32325
SCHERPELZ, R. I. N83-32532
SCHEURER, B. N83-31773
SCHICHTLE, C. N83-31704
SCHIMMEL, M. L. N83-31596
SCHLIEPHAKE, R. W. N83-32160
SCHMIDT-NIELSEN, A. N83-31941
SCHMIDT, E. M. N83-31706
SCHMIDT, W. R. N83-32045
SCHNEIDER, J. F. N83-32030
SCHNEIDER, R. E. N83-31874
N83-32068
SCHNEIDER, R. L. N83-31569
SCHNEPPLE, W. N83-32037
SCHOENBERG, I. J. N83-32443
SCHOENBORN, B. P. N83-32636
SCHOFIELD, D. N83-31921
N83-31922
SCHOTT, J. R. N83-32146
SCHRAG, R. C. N83-32380
SCHREYER, H. L. N83-32097
SCHUCHARD, K. M. N83-32172
SCHUCK, J. W. N83-31602
SCHUELLER, P. G. N83-32612
SCHUH, A. N83-32637
SCHULSON, E. M. N83-32102
SCHUMACHER, R. J. N83-31874
SCHWAB, R. T. N83-31600
SCHWABE, D. N83-31671
SCHWALB, H. R. N83-32223
SCHWARTZ, G. N83-32590
SCHWARZ, M. L. N83-32012
SCHWIDERSKI, E. W. N83-32264
SEAGRAVES, P. H. N83-32702
SEALOCK, L. J., JR. N83-31893
SECKEL, D. N83-32553
SEELIG, W. N. N83-32259
SEGUR, H. N83-32263
SEIDERS, R. P. N83-31871
SEILER, J. F. N83-31884
SELBERHERR, S. N83-32425
SELLERS, F. J. N83-31603
SELTZER, S. M. N83-32562
SEMENOV, B. G. N83-31812
SEN, A. N83-31861
SENICHEVA, K. F. N83-31812
SENILLOU, C. N83-31684
SENIOR, C. N83-32220
SENIOR, T. B. A. N83-31932
N83-31974
SERVER, W. L. N83-32113
SESSLER, A. M. N83-32541
N83-32542
SHADRIN, L. N. N83-32122
SHAFFER, L. E. N83-32672
SHAHANI, H. N83-31648
SHALIMOVA, A. I. N83-31796
SHAPIRO, R. N83-32699
SHARIKOV, V. I. N83-31814
SHARPE, D. M. N83-32188
SHAVER, D. K. N83-32661
SHEELEY, N. R., JR. N83-32697
SHEFFIELD, C. A. N83-32140
SHEIBLEY, D. W. N83-32176
SHELEKHOV, E. V. N83-31796
SHEN, S. F. N83-31914
SHENSA, M. J. N83-32468
SHEPELEVA, F. A. N83-31801
SHEPHERD, J. E. N83-31775
SHEPHERD, R. A. N83-31945
SHERROD, J. A. N83-32646
SHERSHNEV, A. A. N83-31728
SHERWOOD, R. J. N83-32392
SHIH, H. M. N83-31732
SHIMABUKURO, Y. E. N83-32137
SHIMMIN, W. I. N83-31758
SHIMODA, T. N83-32490
SHIRANE, G. N83-32041
SHIU, Y. J. N83-32044
SHKOLNIKOVA, E. Y. N83-31728
SHNYUKAS, D. N83-31628
SHOCKEY, D. A. N83-32101
SHUMKA, A. N83-31919
SHUNIN, V. R. N83-31812
SIEGEL, D. I. N83-32162
SIEKMANN, J. N83-31670
SIEMERS, P. M., III N83-31636
SIGMAN, R. K. N83-31721
SIGURDSSON, S. N83-32407
SILVA, G. N83-31691
SILVER, A. H. N83-31962
SILVESTER, L. F. N83-32014
SIMMONS, A. N83-31741
SIMMONS, M. A. N83-32576
SIMON, F. N83-31849
SIMONEN, E. P. N83-31631
SINGER, C. E. N83-32600
SINGER, M. A. N83-32405
SINGER, S. N83-32608
SINGH, A. K. N83-32461
SINHA, B. K. N83-32429
SISCO, J. N83-32378
SKAKOV, Y. A. N83-31796
SKALSKI, S. C. N83-32387
SKARITA, J. N83-32512
SLATER, J. N83-32061
SLOTER, L. E. N83-31826
SLOWEY, J. W. N83-32207
SLUD, E. N83-32431
SMALLRIDGE, R. C. N83-32289
SMART, D. F. N83-32703
SMITH, A. B. N83-32537
SMITH, C. F. N83-32451
SMITH, D. M. N83-31713
SMITH, J. E. N83-32043
SMITH, J. P. N83-32066
SMITH, K. T. N83-32519
SMITH, L. N83-32593
SMITH, R. B. N83-32215
SMITH, R. C. N83-31937
SMITHIES, F. N83-32326
SMY, J. R. N83-31994
SMYRNOV, H. V. N83-32125
SMYTH, D. M. N83-31750
SMYTH, W. H. N83-32696
SODERSTRAND, M. A. N83-31963
SOFFER, B. H. N83-32579
SOGA, T. N83-32495
N83-32496
SOLDAT, K. L. N83-32531
SOLOWAY, E. N83-32365
SONA, P. G. N83-31692

SONI, S. N83-31739
SONNICHSEN, T. W. N83-32193
SOSNOWSKI, M. N83-31989
SOUGANIDIS, P. E. N83-32421
N83-32445
SOUTHWORTH, S. H. N83-32033
SOVETKIN, V. L. N83-31995
SOVEY, J. S. N83-31855
SPAEHN, H. N83-31802
SPANOS, P. T. D. N83-32092
SPEAR, R. J. N83-31888
SPEARS, W. D. N83-32303
SPECKER, P. N83-31934
SPEER, S. W. N83-32230
SPENCER, D. J. N83-32047
SPENCER, R. K. N83-32565
SPENCER, R. L. N83-32604
SPIEWAK, I. N83-32668
SPINWEBER, C. L. N83-32309
SPOHR, R. N83-32644
SPRANGLE, P. N83-32526
SPRENGER, H. N83-31693
STAINES, A. M. N83-31852
N83-31913
STAMPER, J. A. N83-32596
STANG, R. G. N83-31831
STANNETT, V. T. N83-32672
STAPELMANN, J. N83-31655
STEEG, M. N83-31807
STEELE, K. F. N83-32156
N83-32157
STEGER, J. G. N83-32574
STEINBERG, D. M. N83-32465
STEINBICHLER, H. N83-31699
STEINCHEN, A. N83-31681
STEINERT, W. N83-31771
STEPANOV, G. V. N83-31809
STEPHENS, C. O. N83-31595
STEPHENS, M. M. N83-32039
STERNBERG, R. L. N83-32406
STEUER, K. H. N83-32610
STEWART, C. L. N83-32219
STEWART, C. R. N83-32035
N83-32284
STIERMAN, R. J. N83-31846
STILES, R. J. N83-31997
STOCKBAUER, R. N83-32527
STOCKWELL, R. D. N83-32069
STONE, G. L. N83-32453
N83-32454
STOUT, M. G. N83-31840
STRADLEY, N. H. N83-31881
STREIT, R. L. N83-32410
STRICKERT, R. G. N83-31776
STRIKWERDS, J. C. N83-32415
STROCKA, B. N83-32644
STRONG, L. H. N83-32296
N83-32300
STUBBLEFIELD, F. W. N83-31987
STUDER, P. A. N83-32067
SULLIVAN, E. M. N83-32028
SULLIVAN, J. A. N83-32020
SULLIVAN, T. J. N83-32221
SUMITA, U. N83-32403
N83-32435
N83-32474
SUN, R. L. T. N83-32023
SUNKEL, W. E. N83-32258
SUTER, P. N83-31605
SUTTON, C. W. N83-32031
SUYAROV, D. I. N83-32088
SWANN, D. N83-31591
SWEANY, R. S. N83-31890
SWIFT, M. R. N83-32276
SZ.-NAGY, B. N83-32327
SZETO, L. T. N83-32264
SZULEWSKI, P. A. N83-32363
SZYMCZAK, W. G. N83-32439
N83-32440

T

TAGAWA, H. N83-31850
TAKAHASHI, N. N83-32498
TAKAI, M. N83-31875
TAKANISHI, M. N83-32496
TAKANO, T. N83-31850
TAKEMURA, A. N83-32418
TAKUMA, M. N83-32505
TALBOT, L. N83-32018
TALLIS, W. J. N83-32514
TAMBA, M. N83-32481
TANABE, T. N83-32489
TANAKA, K. N83-32552
TANAKA, Y. N83-32508
TARASKO, D. I. N83-31803
TAYLOR, B. A. N83-32334
TAYLOR, C. N83-32513
TAYLOR, D. R. N83-32436
TAYLOR, J. N83-32390
TAYLOR, M. N83-31723
TAYLOR, W. N83-32370
TEN, V. N. N83-31805
TENNEY, S. D. N83-32669
TENNYSON, L. C. N83-32172
TERADA, Y. N83-31762
TERRY, J. E. N83-31576
TESHIMA, K. N83-32498
THIBAULT, P. N83-32024
THILLY, W. G. N83-32196
THOMAS, D. J. N83-32278
THOMAS, G. N83-31839
THOMAS, K. S. N83-32534
THOMAS, M. T. N83-31784
THOMPSON, L. E., JR. N83-31777
THOMPSON, R. E. N83-32028
THOMPSON, S. L. N83-32257
THOMPSON, T. K. N83-32574
THORNE, P. D. N83-32159
THORNTON, E. A. N83-32107
THUMM, M. N83-32612
THUOT, M. N83-32608
THURBER, L. R. N83-31964
TIBBETTS, T. A. N83-32643
TIEDERMAN, W. G. N83-32003
TIGHE, N. J. N83-31862
N83-31883
TILGHMAN, A. N83-31982
TOBIN, R. G. N83-31765
TODD, L. L. N83-31601
TOLAN, J. S. N83-32016
TOLLES, W. M. N83-32663
TONG, R. M. N83-32308
TORITSYN, L. N. N83-31995
TOUART, C. N. N83-32699
TRAHAN, C. Y. N83-32394
TRAPPENIERS, N. J. N83-31696
TRAVIS, C. T. N83-32673
TREMAINE, S. G. N83-32042
TRETYAKOV, A. V. N83-31806
TRINH, E. H. N83-31993
N83-32515
TRISKA, A. N83-31649
TRITCHLER, W. K. N83-31947
TROCKI, L. K. N83-32574
TSANG, C. F. N83-32565
TSIBIN, I. P. N83-31728
TSUCHIDA, A. N83-32505
TSUI, T. L. N83-32252
TURNBULL, R. J. N83-32525
TURNER, D. J. N83-31698
TURNER, R. E. L. N83-32000
TUSZEWSKI, M. N83-32604
TWARD, E. N83-31897
TWOGOOD, R. E. N83-32392

U

ULLMAN, J. D. N83-31961
USILANER, B. L. N83-32312

V

VAHLAS, C. N83-31684
VALDES, P. M. N83-32359
VALTORTA, M. N83-32411
VANDEN-BROECK, J. M. N83-32261
VANDENBERG, L. N83-32037
VANDERPUT, M. N83-32331
VANECK, O. J. N83-32226
VANSTEENBERGEN, A. N83-32064
VANTASSEL, R. A. N83-32213
VARLI, K. V. N83-31811
VARMA, I. K. N83-31854
VAROPOULOS, N. N83-32329
VASILAKIS, A. D. N83-31904
VASKEVICH, E. A. N83-31622
VAUGHAN, B. E. N83-32194
VAVRA, J. N83-32065
VEGA, J. M. N83-31676
VELARDE, M. G. N83-31674
VELASCO, F. R. D. N83-32126
VENTURINI, E. L. N83-31742
VERGHESE, G. C. N83-32417
VERINK, E. D., JR. N83-32365
VEZIROGLU, T. N. N83-32179
VIETSCH, W. K. N83-32316
N83-32328
VINAS, A. F. N83-32595
VINCENT, R. L. N83-31601
VINEYARD, E. A. N83-31904
VINOGRADOV, V. I. N83-32087
VISKANTA, R. N83-32010
VISSCHER, W. M. N83-32080
VOLKOV, G. V. N83-31630
VONTIESENHAUSEN, G. F. N83-31895

W

WACHTMANN, R. F. N83-32699
WADLINGER, E. A. N83-32545
WAGNER, G. N83-31802
WAGNER, H. M. N83-32478
WAGNER, L. S. N83-31924
WAGNER, R. L. N83-31951
WAGONER, D. E. N83-31951
WAHLSTEDT, M. J. N83-32345
WAITE, B. A. N83-32546
WALKER, D. A. N83-32266
WALKER, W. R. N83-32173
WALLACE, R. J. N83-32009
WALSH, P. R. N83-32278
WALTZ, D. L. N83-32401
WANDERS, K. N83-31699
WANG, H. M. N83-31991
WANG, J. S. Y. N83-32565
WANG, K. K. N83-31914
WANG, M. C. N83-32105
WANG, N. N83-31931
WANG, T. G. N83-31896
N83-31993
N83-32515
WARD, J. F. N83-32231
WARD, J. R. N83-31871
WARREN, R. N83-32513
WARREN, W. R. N83-32047
WARWICK, A. N83-32556
WASYNCZUK, J. A. N83-31833
WATANABE, I. N83-31850
WATSON, G. F. N83-32252
WATSON, J. D. N83-31758
WATSON, J. S. N83-32011
WATT, J. P. N83-32614
WATT, R. G. N83-32534
WATTLE, B. J. N83-32581
WATTS, K. D. N83-32602
WEBB, W. B. N83-32291
WEBER, R. A. N83-31820
WEBSTER, J. J. N83-31793
WEBSTER, P. J. N83-32239
WEI, C. Y. N83-32618
WEIDERHORN, S. M. N83-31862
WEIGUANG, D. N83-32585
WEIK, F. N83-32556
WEIR, R. C. N83-32235
WEISS, H. M. N83-32310
WEISS, M. S. N83-32278
WEISSTEIN, N. N83-32582
WELCH, D. O. N83-32630
WELKER, W. J., JR. N83-32375
WELLNER, J. N83-32435
WELLS, C. V. N83-31907
WELSH, J. P., JR. N83-32268
WENJIN, H. N83-32585
WENLAN, Z. N83-32585
WERTHEIMER, T. B. N83-32098
WEST, C. D. N83-32668
WEST, R. N. N83-32578
WESTRA, S. N83-32058
WEWERKA, E. M. N83-32574
WEYUKER, E. J. N83-32364
WHALEN, J. F. N83-32537
WHEELER, M. L. N83-32574
WHEELER, T. G. N83-32282
WHITAKER, R. B. N83-31874
WHITBECK, R. F. N83-32450
WHITE, R. T. N83-31853
WHITE, S. C. N83-32286
WHITMOYER, D. E. N83-31785
WHITTEN, W. N83-32389
WICKWAR, V. B. N83-32208
N83-32220
WIEBE, W. N83-32071
WIEMAN, H. N83-32556
WILBANKS, T. J. N83-32668
WILCOX, J. M. N83-32700
WILCOX, R. B. N83-31722
WILEY, N. N83-32675
WILKES, B. Y. N83-32668
WILLETT, G. A. N83-32170
WILLETT, J. C. N83-32027
WILLIAMS, F. A. N83-31667
WILLIAMS, J. A. N83-31983
WILLIAMS, R. A. N83-31601

WILLIAMS, R. T. N83-32241
WILLIAMSON, D. N83-32256
WILLIAMSON, S. N83-32586
WILLSKY, A. S. N83-32417
WILSON, D. W. N83-32202
WILSON, H. W. N83-32044
WILSON, K. R. N83-32058
N83-32586
WILSON, L. G. N83-32167
WINGROVE, R. C. N83-32676
WINNICKI, J. N83-32431
WINNINGHOFF, F. J. N83-32241
WINSLOW, W. N83-32301
WISNIEWSKI, H. L. N83-32108
WITKOP, D. L. N83-32387
WITTIG, C. N83-32528
WITZE, P. O. N83-31767
WLAKLET, T. H. N83-31945
WOLBACH, C. D. N83-32203
WOLBARSHT, M. L. N83-32288
WOLF, D. N83-32622
WOLF, G. K. N83-31787
WOLFF-FISCHER, E. N83-32160
WOLFF, S. C. N83-32693
WONG, E. N83-32374
WOOD, D. M. N83-31917
WOODBURY, H. H. N83-32618
WOOSLEY, S. E. N83-32566
WORM, G. H. N83-31574
WORRELL, R. B. N83-32452
WRIGLEY, R. C. N83-32143
N83-32145
WROBLEWSKI, K. A. N83-31602
WU, J. N83-32251
WU, Z. N83-32424
WUERTZ, K. L. N83-32687
WUEST, E. N83-32637
WUEST, W. N83-31670
WULLAERT, R. A. N83-32113
WYCKOFF, D. N83-32369

Y

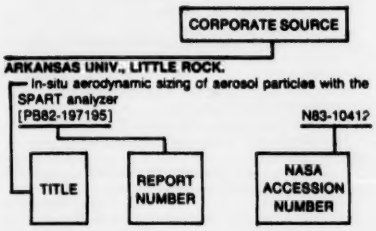
YAEGER, J. R. N83-31572
YAGNIK, S. K. N83-32633
YAGODKIN, Y. D. N83-31804
YAMADA, M. N83-31850
YAMAMOTO, S. N83-32499
YAMAMOTO, T. N83-32508
YAMANE, M. N83-31770
YANG, L. C. N83-31954
YARBOROUGH, W. M. N83-32040
YASUHARA, M. N83-32496
YASUKAWA, E. A. N83-32702
YASUNAGA, T. N83-32507
YELLEN, H. W. N83-31946
YEN, D. W. L. N83-32434
YGER, A. N83-32334
YIP, S. N83-32382
YODER, G. R. N83-31825
YOFFE, E. H. N83-32103
YOKOTA, H. N83-32489
YONG, C. N83-31982
YOUNG, J. F. N83-32509
YOUNG, R. W. N83-32666
YOUNG, S. G. N83-31795
YOUNG, T. R., JR. N83-32697
YU, L. H. N83-32064
YUKON, S. P. N83-31933
YUNGKURTH, C. B. N83-32589

Z

ZAKHAROV, E. K. N83-31814
ZAYTSEV, Y. N83-31618
ZEE, A. N83-32553
ZEFIRO, L. N83-31660
ZELKOWITZ, M. V. N83-32360
ZEMSKOV, V. S. N83-31688
ZERBY, A. C. N83-32668
ZEVELY, J. S. N83-32624
ZEZULOVA, M. N83-31810
ZHANG, Y. N83-32055
ZHIMERIN, D. N83-32650
ZHUKOV, G. N83-31649
ZHUN, W. N83-32077
ZHURAVLEV, A. N83-32652
ZICKER, J. E. N83-31950
ZIMMERMAN, D. A. N83-32159
ZIMMERMAN, I. H. N83-32529
ZIMMERMAN, R. M. N83-32034
ZIOLKOWSKI, R. W. N83-31949
ZIPPERIAN, T. E. N83-31977
N83-32640
ZUBAL, I. G. N83-32591

CORPORATE SOURCE INDEX

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ACADEMY OF SCIENCES (USSR), MOSCOW.
Experiments on crystallization of semiconductors aboard Salyut 6: Soyuz orbital complex N83-31688
The main results of the space material science experiments within the framework of Intercosmos program N83-31700
Solidification of PbSn alloys under microgravity conditions N83-31701
Periodic crystallization of binary melts under diffusion controlled mass transfer N83-31702
Directional crystallization of Pb Te under microgravity conditions N83-31703

ACUREX CORP., MOUNTAIN VIEW, CALIF.
Analysis of geothermal wastes for hazardous components
[PB83-188680] N83-32203

ADAPTIVE SENSORS, INC., SANTA MONICA, CALIF.
New syndrome decoding techniques for convolutional codes over GFq
[AD-A127955] N83-32432

ADVANCED INFORMATION AND DECISION SYSTEMS, MOUNTAIN VIEW, CALIF.
Option generation techniques for command and control
[AD-A127715] N83-32308
Intelligent interpretation of 3-D imagery
[AD-A127710] N83-32583

ADVANCED MECHANICAL TECHNOLOGY, INC., NEWTON, MASS.
Design and development testing of an improved high-efficiency water heater
[DE83-006136] N83-31904

ADVANCED RESEARCH AND APPLICATIONS CORP., SUNNYVALE, CALIF.
Study of fatigue durability of advanced composite materials under conditions of accelerated loading
[NASA-CR-166405] N83-31732

ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT, NEUILLY-SUR-SEINE (FRANCE).
Calendar of selected aeronautical and space meetings
[AGARD-CAL-83/1] N83-32706

AEG-TELEFUNKEN, FRANKFURT AM MAIN (WEST GERMANY).
Schottky and MIS type amorphous-silicon solar cells
[BMFT-FB-T-83-043] N83-32184

AEROJET LIQUID ROCKET CO., SACRAMENTO, CALIF.
LOX/hydrocarbon fuel carbon formation and mixing data analysis
[NASA-CR-168066] N83-31886

AERONAUTICAL RESEARCH ASSOCIATES OF PRINCETON, INC., N. J.
Integrable models of shallow water waves
[AD-A127816] N83-32263

AERONAUTICAL RESEARCH LABS., MELBOURNE (AUSTRALIA).
Estimation programs for dynamic flight test data analysis
[AD-A128527] N83-31585
Combat performance evaluation of fighter aircraft: A suite of FORTRAN-IV programs based on energy manoeuverability theory
[AD-A128263] N83-31599
Operating instructions manual for Microprocessor Airborne Data Acquisition and Replay (MADAR) module
[AD-A128558] N83-32031

AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AFB, OHIO.
Building and operating the logistics composite model (LCM) for new weapon systems, part A
[AD-A127538] N83-32662
Planning and scheduling enhancement in the aquisition process 2tt the Aeronautical Systems Div.
[AD-A128521] N83-32666

AEROSPACE CORP., EL SEGUNDO, CALIF.
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 4: Test generation
[AD-A127985] N83-31967
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 1: Executive summary
[AD-A127984] N83-31968
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 8: Fault simulation
[AD-A128019] N83-31971
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 7: Built-In Testing (BIT) and Built-In Test Equipment (BITE)
[AD-A128587] N83-31975
F-atom depletion in NF3 combustor laser flows
[AD-A127075] N83-32047
A comparison of the MSIS and Jacchia-70 models with measured atmospheric density data in the 120 to 200 km altitude range
[AD-A128005] N83-32216

AGRICULTURAL RESEARCH SERVICE, MANDAN, N. DAK.
The water factor in harvest-sprouting of hard red spring wheat
[E83-10376] N83-32129
Rain-induced spring wheat harvest losses
[E83-10377] N83-32130

AGRICULTURAL RESEARCH SERVICE, WESLACO, TEX.
The equivalence of three techniques for estimating ground reflectance from LANDSAT digital count data
[E83-10378] N83-32131

AIR FORCE ACADEMY, COLO.
Air Force Academy Aeronautics Digest, Spring/Summer 1982
[AD-A128248] N83-31571

AIR FORCE ENGINEERING AND SERVICES CENTER, TYNDALL AFB, FLA.
A study of factors affecting soot formation in a swirl-stabilized combustor
[AD-A128255] N83-31754

AIR FORCE GEOPHYSICS LAB., HANSCOM AFB, MASS.
Polyethylene free balloon design from the perspectives of user and designer
[AD-A127553] N83-31583
Rocketborne measurements of optical emissions from the auroral E-layer
[AD-A127517] N83-32213
Mesoscale climatology of cloud cover over Korea and Germany
[AD-A127521] N83-32237
An assessment of the AN/GMQ-13 cloud height set capability to meet AWS requirements
[AD-A127516] N83-32238

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
Effect of test result uncertainty on the performance of a context-free troubleshooting task
[AD-A128584] N83-31573
Design of a multivariable tracker control law for the A-7D Digitac 2 aircraft
[AD-A127440] N83-31607
A lateral-directional controller for high-angle-of-attack flight
[AD-A128579] N83-31609
Optimization of long range major rehabilitation of airfield pavements
[AD-A127579] N83-31613
Aeroelastic properties of straight and forward swept graphite/epoxy wings
[AD-A127014] N83-31734
Electromagnetic mirror dynamics
[AD-A127515] N83-31938
Ultra-stable laser clock
[AD-A127519] N83-32054
Design, construction, testing and evaluation of a residential ice storage air conditioning system
[AD-A128582] N83-32183
A study of computer-aided geometric optical design
[AD-A127438] N83-32345
An application of a computer optical design program
[AD-A127857] N83-32375
Interactive automated system for normalization of relations
[AD-A127496] N83-32673
The net effect of many gravitational fields on the intensity of celestial light sources
[AD-A127514] N83-32694

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH, BOLLING AFB, WASHINGTON, D.C.
The 1983 AFOSR/AFRPL Chemical Rocket Research Meeting
[AD-A127812] N83-31756

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Composite coaxial telecommunications cable
[AD-A127810] N83-31969
Electronic technology (selected articles)
[AD-A127809] N83-31970
The NMR (Nuclear Magnetic Resonance) sensor for calibrating the field of a superconducting solenoid
[AD-A127997] N83-31973
Automation of electric power system (selected articles)
[AD-A127839] N83-32055
Nondestructive inspection and measurement
[AD-A127971] N83-32077
Computer optical fiber data transmission system
[AD-A127724] N83-32585

AIR FORCE WEAPONS LAB., KIRTLAND AFB, N. MEX.
Automated instrumentation system verification
[AD-A127775] N83-32030

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
The F-4C/D life extension program
[AD-A127495] N83-31589
Wind tunnel experiments on the divergence of swept wings with composite structures
[AD-A127950] N83-31582
Optimality criterion methods in structural optimization
[AD-A127991] N83-32106

AIRESEARCH MFG. CO., TORRANCE, CALIF.
Advanced single permanent magnet axipolar ironless stator ac motor for electric passenger vehicles
[NASA-CR-167974] N83-32687

AKRON UNIV., OHIO.
Fracture mechanics applied to elastomeric composites
[AD-A127000] N83-31856
Tear strength of elastomers under threshold conditions
[AD-A127006] N83-31857
Fracture toughness of polybutadiene at cryogenic temperatures
[AD-A126999] N83-31858
The role of chemical bonding in adhesion
[AD-A127467] N83-31867

ALABAMA UNIV., HUNTSVILLE.
X-ray diffraction analysis of Nb-3Ge and NbGe alloys
[NASA-CR-170831] N83-31744

AMERICAN TELEPHONE AND TELEGRAPH CO., NEW YORK.
Customer premises services market demand assessment 1980 - 2000. Volume 1: Executive summary
[NASA-CR-168150] N83-31925
AMES LAB., IOWA.
Kinetics and mechanisms of the reactions of aliphatic free radicals with organocobaloximes and fluoropentaamminecobalt (III) ion and of iron (III) with methyrodoxime
[DE83-004856] N83-31779
Kinetics of the reduction of calcium sulfate with carbon monoxide and hydrogen
[DE83-004963] N83-31780
Hydrogenation of carbon monoxide over ruthenium-rhenium on alumina catalysts
[DE83-004975] N83-31785
Absorption of ethanol and water vapor by Silicalite, a hydrophobic molecular sieve
[DE83-004981] N83-31788
Metal clusters and extended metal-metal bonding in metal oxide systems
[DE83-003793] N83-31821
Early stages of sulfidation of iron and iron-chromium alloy in hydrogen sulfide
[DE83-004969] N83-31837
Halide and chalcogenide clusters of the early transition metals
[DE83-003792] N83-31841
Magnetic-resonance studies of reactively sputtered amorphous silicon-hydrogen alloys
[DE83-004958] N83-31842
Activity of hydrogen in metal-hydrogen systems: Strontium, thorium-nitrogen and vandaium alloys
[DE83-004976] N83-31843
Hydrogen and deuterium diffusion in vanadium alloys
[DE83-004964] N83-31845
Magnetic susceptibility of scandium-hydrogen and lutetium-hydrogen solid-solution alloys from 2 to 300 deg K
[DE83-004786] N83-31846
Study of the anomalous behavior of the electrical resistivity in alloys near the PrNi5.0 composition
[DE83-004787] N83-31847
Irreversible cooperative processes on lattices
[DE83-004795] N83-31878
Studies of a molybdenum-molybdenum bonded species. 1: Synthesis and characterization of a reduction product of Cs3Mo2Cl8H. 2: Mixed sulfur/chlorine-substituted hexanuclear and molybdenum clusters
[DE83-04971] N83-31879
Simplified methods for the inelastic analysis and reliability assessment of stiffened shells
[DE83-004966] N83-32100
Simplified analysis of shells with local, impulsive loads
[DE83-003791] N83-32119
Coulomb dissociation in relativistic heavy-ion reactions
[DE83-005004] N83-32557
The crystal and molcular structures of selected ruthenium (II) phosphate complexes and vinyl bromide-benzothiophene adducts
[DE83-004788] N83-32635
Electronic structure of hcp lutetium
[DE83-004866] N83-32643
AMORPHOUS MATERIALS, INC., GARLAND, TEX.
Large plate CdTe synthesis by sealed vessel transport
[AD-A127893] N83-32616
AMSTERDAM UNIV. (NETHERLANDS).
Optical investigation of critical behavior in simple fluids at reduced gravity N83-31696
APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., LAUREL, MD.
Ocean energy system at the Johns Hopkins University Applied Physics Laboratory
[PB83-180034] N83-32185
ARGONNE NATIONAL LAB., ILL.
Spectroscopic properties of the f-elements in compounds and solutions
[DE83-007963] N83-31759
Advanced pressurized fluidized-bed combustion
[DE83-007641] N83-31760
A study of the uranium-aluminum-silicon system
[DE83-002345] N83-31836
Effects of irradiation on ceramics for fusion-reactor applications
[DE83-009468] N83-31872
Liquid transfer and entrainment correlation for droplet-annular flow
[DE83-007703] N83-32019
Computer program abstract as software documentation
[DE83-007570] N83-32391
Fast-neutron total and scattering cross sections of niobium
[DE83-002285] N83-32537
Fermi-surface properties of CeSn-3 and related compounds
[DE83-008606] N83-32621
Formation energy of point defects in free surfaces and grain boundaries in MgO
[DE83-008524] N83-32622
Observation of a first-order phase transition in single-crystal ErRh-4B4 at Hc-2
[DE83-008609] N83-32623
ARINC RESEARCH CORP., ANNAPOLIS, MD.
Cost development of the dual-channel GPS (Global Positioning System) navigator for general aviation application
[AD-A127157] N83-31591
ARIZONA STATE UNIV., TEMPE.
An artificial intelligence technique to generate self-optimizing experimental designs
[AD-A127764] N83-32402
ARIZONA UNIV., TUCSON.
Analysis and calculation of macrosegregation in a casting ingot, exhibit D
[NASA-CR-170846] N83-31818
The role of a mental model in learning to operate a device
[AD-A127281] N83-32305
ARIZONA WATER RESOURCES RESEARCH CENTER, TUCSON.
Bibliography on ground-water recharge in arid and semiarid areas
[PB83-182055] N83-32167
ARMY AEROMEDICAL RESEARCH UNIT, FORT RUCKER, ALA.
Annotated bibliography of USAARL (United States Army Aeromedical Research Laboratory) technical and letter reports, 1 June 1963 - 30 April 1983
[AD-A127451] N83-32292
ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, ABERDEEN PROVING GROUND, MD.
Simultaneous determination of molar absorption coefficients and equilibrium constants for monomer-dimer equilibria
[AD-A128599] N83-31871
An improved strain hardening characterization in the ADINA code using the mechanical sublayer model
[AD-A128287] N83-32108
ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, DOVER, N. J.
Interactive graphics package to facilitate a comparison of data with statistical distributions
[AD-A127147] N83-32372
ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, WATERVLIET, N. Y.
Thermo-elastic-plastic analysis of a thick-walled cylinder with temperature-dependent yield stress
[AD-A127447] N83-32099
ARMY AVIATION ENGINEERING FLIGHT ACTIVITY, EDWARDS AFB, CALIF.
Fuel conservation evaluation of US Army helicopters. Part 5: AH-1S slight testing
[AD-A128532] N83-31601
ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, ST. LOUIS, MO.
Polyurethane paint (PUP) Chemical Agent Resistant Coating (CARC) for Army aircraft
[AD-A128006] N83-31868
ARMY COASTAL ENGINEERING RESEARCH CENTER, FORT BELVOIR, VA.
The elevation and duration of wave crests
[AD-A127872] N83-32259
Forcing regression through a given point using any familiar computational routine
[AD-A127868] N83-32416
ARMY COLD REGIONS RESEARCH AND ENGINEERING LAB., HANOVER, N. H.
Chemical fractionation of brine in the McMurdo Ice Shelf, Antarctica
[AD-A127821] N83-32262
ARMY CONSTRUCTION ENGINEERING RESEARCH LAB., CHAMPAIGN, ILL.
Effects of high heat input welding of construction steels A36, A514, and A516
[AD-A127083] N83-31820
Electronic time switch evaluation study
[AD-A127870] N83-31964
ARMY ENGINEER TOPOGRAPHIC LABS., FORT BELVOIR, VA.
Intertial survey application to civil works
[AD-A127508] N83-32153
ARMY MATERIALS AND MECHANICS RESEARCH CENTER, WATERTOWN, MASS.
A general purpose residual stress analyzer
[AD-A127820] N83-32109
The measurement of X-ray residual stress in textured cubic materials
[AD-A127822] N83-32620
ARMY MEDICAL RESEARCH INST. OF INFECTIOUS DISEASES, FREDERICK, MD.
Circadian growth hormone and prolactin blood concentration during a self-limited viral infection and artificial hyperthermia in man
[AD-A127501] N83-32289
ARMY MILITARY PERSONNEL CENTER, ALEXANDRIA, VA.
Comparison of weight training and calisthentic exercise programs in developing strength and muscular endurance in United States Army recruits
[AD-A128067] N83-32295
The commercialization of new technologies transfer from laboratory to firm
[AD-A128233] N83-32688
ARMY RESEARCH INST. OF ENVIRONMENTAL MEDICINE, NATICK, MASS.
Hypohydration and acclimation: Plasma renin activity and aldosterone during heat/exercise stress
[AD-A128154] N83-32294
Metabolic and vascomotor insulative responses occurring on immersion in cold water
[AD-A128021] N83-32296
Thermoregulatory responses to upper body exercise
[AD-A127884] N83-32298
Hypohydration and acclimation: Effects on hormone responses to exercise/heat stress
[AD-A127855] N83-32299
A model of heat loss and thermoregulation for immersion in cold water
[AD-A127854] N83-32300
ARMY TROOP SUPPORT AND AVIATION MATERIEL READINESS COMMAND, ST. LOUIS, MO.
Historical inflation program. A computer program generating historical inflation indices for Army aircraft, revision
[AD-A127674] N83-32677
ARTEC ASSOCIATES, INC., HAYWARD, CALIF.
Noise thermometry measurements in combustion processes
[AD-A127945] N83-31758
ATMOSPHERIC AND ENVIRONMENTAL RESEARCH, INC., CAMBRIDGE, MASS.
Outer satellite atmospheres: Their nature and planetary interactions
[NASA-CR-172945] N83-32696
ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON (ENGLAND).
Calculation of the shielding effect of solid shell enclosures
[AWRE-O18/82] N83-31920
AURORA ASSOCIATES, INC., WASHINGTON, D.C.
Cost-benefit impact study on the adoption of the draft proposed revised X3.23 American National Standard Programming Language COBOL
[PB83-191098] N83-32395
AVCO LYCOMING DIV., STRATFORD, CONN.
Integrally cast low-cost compressor
[AD-A127663] N83-31824

B

BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
Grid network generation with adaptive boundary points for projectiles at transonic speed
[AD-A128041] N83-31584
The aerodynamics range: A national historic mechanical engineering landmark
[AD-A128042] N83-31706
A modification to a flashlamp-pumped dye laser to increase stability of the spatial mode
[AD-A128037] N83-32057
BATTELLE COLUMBUS LABS., OHIO.
Evaluation of outer race tilt and lubrication on ball wear and SSME bearing life reductions
[NASA-CR-170836] N83-32069
BATTELLE INST., FRANKFURT AM MAIN (WEST GERMANY).
Oscillatory convection in a spherical cavity due to g-jitter N83-31694
BATTELLE PACIFIC NORTHWEST LABS., RICHLAND, WASH.
Pacific Northwest Regional Biomass Program
[PB83-188623] N83-31893
Biological intrusion barriers for large-volume waste-disposal sites
[DE83-002061] N83-32571
BAYER A.G., LEVERKUSEN (WEST GERMANY).
Polymer intermediates from limonene
[BMFT-FB-T-83-053] N83-31882
BELL AEROSPACE CO., BUFFALO, N. Y.
Force method optimization II. Volume 2: User's manual
[AD-A128235] N83-32387

BELL TELEPHONE LABS., INC., MURRAY HILL, N. J.
High-resolution X-ray scattering
[DE83-004599] N83-32592
BENDIX CORP., KANSAS CITY, MO.
Method for the preparation of polymers
[DE83-004941] N83-31880
BERGBAU-FORSCHUNG G.M.B.H., ESSEN (WEST GERMANY).
Systematic studies on coals of different deposits, including their mineral matter
[BMFT-FB-T-83-068] N83-32160
BETTIS ATOMIC POWER LAB., PITTSBURGH, PA.
A PACER: A Monte Carlo time-dependent spectrum program for generating few-group diffusion-theory cross sections
[DE83-003779] N83-32351
BGS SYSTEMS, INC., WALTHAM, MASS.
POD-HOS (Performances Oriented Design-Higher Order Software) interfaces: An examination of AXES/POD relationships and other issues
[AD-A128301] N83-32384
BIONETICS CORP., COCOA BEACH, FLA.
Space transportation system biomedical operations support study
[NASA-CR-166834] N83-32286
BONN UNIV. (WEST GERMANY).
Quasilinear elliptic-parabolic differential equations
[PREPRINT-568] N83-32458
BOWLING GREEN STATE UNIV., OHIO.
Perturbation analysis of the limit cycle of the free van der Pol equation
[NASA-CR-172166] N83-32341
BRAUN (C. F.) AND CO., ALHAMBRA, CALIF.
Fossil fuel gasification technical evaluation services
[PB83-195107] N83-31894
BREUER AND ASSOCIATES, ENCINO, CALIF.
State-of-the-art assessment of testing and testability of custom LSI/VLSI circuits. Volume 7: Built-In Testing (BIT) and Built-In Test Equipment (BITE)
[AD-A128587] N83-31975
BRISTOL UNIV. (ENGLAND).
Interaction of waves and currents
[AD-A128551] N83-32265
BRITISH AEROSPACE AIRCRAFT GROUP, KINGSTON-UPON-THAMES (ENGLAND).
Scaling laws for vortex induced debris ingestion into air intakes
[BAE-KRS-N-GEN-274] N83-31575
Aerodynamic ejectors in the UK
[BAE-KRS-N-GEN-243] N83-31594
Composites in ground test services
[BAE-KGT-N-GEN-00999] N83-31729
The trajectory of a heated, buoyant jet in a non-uniform cross-flow
[BAE-KAD-GEN-N-2868] N83-31994
BRITISH LIBRARY LENDING DIV., BOSTON SPA (ENGLAND).
Calculation of, and research into, the particulars of the current of guniting material flowing through a lance nozzle
[BLL-M-34993-(5828.4)] N83-31728
Martensite structure after thermal-magnetic and thermal-mechanical-magnetic treatment
[BLL-M-34939-(5828.4)] N83-31796
Nature of boride phases formed during crystallization of amorphous Fe-B alloys
[BLL-M-35036-(5828.4)] N83-31798
Motive forces of structural changes in ferrosilicon during heating after slight deformations
[BLL-M-35039-(5828.4)] N83-31799
State of production of bimetals and prospects for its development
[BLL-M-35010-(5828.4)] N83-31800
Procedure for testing mechanical properties of high-tensile alloy-steel bolts
[BLL-M-26991-(5828.4)] N83-31801
Effectiveness of boriding of steel in molten sodium-boron-silicate baths
[BLL-M-34988-(5828.4)] N83-31803
Dependence of lattice spacings of the SmCo5 phase on quenching temperature
[BLL-M-34952-(5828.4)] N83-31804
Alloy with enhanced damping properties
[BLL-M-34953-(5828.4)] N83-31805
Analysis of experimental data on rolling of corrosion-resistant steel with hydraulic thrust
[BLL-M-35007-(5828.4)] N83-31806
Production of an aluminium-lead alloy in micro-gravity
[BLL-M-28685-(5828.4)] N83-31807
Characteristics of heat-treatment of R6M5 high-speed powdered steel containing titanium carbide
[BLL-M-34959-(5828.4)] N83-31808
Influence of temperature-deformation conditions on mechanical properties of rolled plate after straightening
[BLL-M-26987-(5828.4)] N83-31809
Problem of corrosion-resistant steels
[BLL-M-26995-(5828.4)] N83-31810
The aging of Co-20 percent Ni - 6.5 percent Nb alloy
[BLL-M-34951-(5828.4)] N83-31811
Protective coatings for marine cables
[BLL-M-34971-(5828.4)] N83-31812
Suitability of low-carbon, ferritic-martensitic steels for cold heading of fastener components
[BLL-M-34972-(5828.4)] N83-31813
Directed solidification of 40KKhNM alloy as a further means of improving the torques of small winding springs
[BLL-M-34969-(5828.4)] N83-31814
Achievements and advanced methods of protection of metal and metal articles from corrosion
[BLL-M-34975-(5828.5)] N83-31815
Thermodynamic functions of carbon solution in liquid nickel and cobalt
[BLL-M-34981-(5828.4)] N83-31816
Calculation of phase equilibrium of Si-O-C system in polynomial form: Communication 1
[BLL-M-34980-(5828.4)] N83-31817
Calculation of turbulent convective heat exchange in a cylindrical channel with a sudden expansion: Communication 2
[BLL-M-34991-(5828.4)] N83-31995
Experience with non-destructive testing of rolled product quality at the Orsk Khalilovo Works
[BLL-M-34974-(5828.4)] N83-32076
Bending moments in oxides on the surface of particles of dispersed iron
[BLL-M-34936-(5828.4)] N83-32085
Determination of stress-concentration factor by the caustic curves method
[BLL-M-34987-(5828.4)] N83-32086
Experimental determination of inter-lap pressure in coils of steel strip
[BLL-M-35006-(5828.4)] N83-32087
Rate and magnitude of deformation during cutting of plate materials
[BLL-M-34983-(5828.4)] N83-32088
Structure of multi-layer spherical crystals of graphite in cast iron
[BLL-M-35028-(5828.4)] N83-32613
BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Characteristics of thermoluminescence glow curves for materials exhibiting more than one glow peak
[DE83-004602] N83-31778
Electrocatalysis on ion-implanted electrodes
[DE82-015768] N83-31787
Polymer concrete patching manual
[PB83-180265] N83-31912
Study of the electric field inside microchannel plate multipliers
[DE83-003944] N83-31978
General-purpose stepping motor-encoder positioning subsystem with standard asychronous serial-line interface
[DE83-004634] N83-31987
Experimental and analytical study of natural-convection heat transfer of internally heated liquids
[DE83-005384] N83-32013
Polarized-neutron spectrometer development and experiments at Brookhaven
[DE83-000978] N83-32041
The Brookhaven free-electron laser experiment
[DE83-002840] N83-32064
Differential rain and snow scavenging efficiency implied by ionic concentration differences
[DE83-006304] N83-32245
High-field superconducting window-frame beam-transport magnets
[DE83-004592] N83-32512
Charge correlations in deep inelastic proton-proton interactions at the CERN ISR: The axial field spectrometer collaboration
[DE83-002324] N83-32539
Report on solar-neutrino experiments
[DE83-001306] N83-32543
Ion time-of-flight spectroscopy: Krypton charge-state spectra as a function of photon excitation energy near the K edge
[DE83-002221] N83-32550
Physical basis for prompt-neutron activation analysis
[DE83-003938] N83-32559
Detecting heavy quarks
[DE83-011365] N83-32561
New accelerators in high-energy physics
[DE83-002817] N83-32570
Dual 7 pinhole tomography
[DE83-004589] N83-32591
High-resolution X-ray scattering
[DE83-004599] N83-32592
Theoretical studies of point defects and diffusion in Nb3Sn
[DE83-005146] N83-32630
Data processing in neutron protein crystallography using positron-sensitive detectors
[DE83-005803] N83-32636
Why QCD lattice theory is important to spin physicists
[DE83-003955] N83-32638
Lattice guage theories
[DE83-002827] N83-32639
BROWN UNIV., PROVIDENCE, R. I.
Some aspects of the plastic deformation of phase mixtures with coarse microstructures
[DE83-001624] N83-31828
BRUSSELS UNIV. (BELGIUM).
Study of the surface tension minimum of aqueous alcohol solutions and movements at the air-solution interface
N83-31668
The influence on the Marangoni effect of a surface tension minimum as a function of temperature in microgravity conditions N83-31669
Convection-Marangoni effects in solidification-microgravity N83-31681
BUREAU OF LAND MANAGEMENT, NEW ORLEANS, LA.
Alabama coastal region ecological characterization. Volume 1: Coastal bibliography
[PB83-180661] N83-32202
BURNS AND MCDONNELL, KANSAS CITY, MO.
Alternate fuels and energy sources for electric department: City of Tallahassee, Florida
[DE83-001694] N83-31889

C

CABLE TECHNOLOGY LABS., INC., NEW BRUNSWICK, N.J.
Electrical-breakdown characteristics and testing of high-voltage XLPE- and EPR-insulated cables
[DE83-000721] N83-31989
CALIFORNIA INST. OF TECH., PASADENA.
Shock compression of single-crystal forsterite
N83-32614
CALIFORNIA STATE UNIV., SACRAMENTO.
Synthesis of hydroxy-terminated dinitropropyl acrylate polymers and improved characterization of hydroxy-terminated prepolymers
[AD-A127469] N83-31866
CALIFORNIA UNIV., BERKELEY.
Distributing a database for parallelism
[AD-A127856] N83-32374
The software scene in the extraction of Eigenvalues from sparse matrices
[AD-A127972] N83-32381
Network management research
[AD-A127667] N83-32398
Analysis of the look ahead Lanczos algorithm
[AD-A128020] N83-32436
CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Hydrocarbons from plants and trees
[DE83-002228] N83-31727
High-resolution electron-energy-loss spectroscopy and photoelectron-diffraction studies of the geometric structure of adsorbates on single-crystal metal surfaces
[DE83-003395] N83-31764
Infrared spectra of CO adsorbed at low temperatures on Ni
[DE83-001568] N83-31765
Classical and semiclassical aspects of chemical dynamics
[DE83-0002024] N83-31766
Influence of chamber length and equivalence ratio on flame propagation in a constant-volume duct
[DE83-002573] N83-31771
Design philosophy for high-resolution rate and throughput spectroscopy systems
[DE83-004117] N83-31782
Crystallography of lath martensite and stabilization of retained austenite
[DE83-003714] N83-31832
Effect of microstructure on fatigue crack growth in duplex ferrite-martensite steels
[DE83-003715] N83-31833
Design of strong, ductile, duplex low alloy steels
[DE83-002606] N83-31834
Study of intergranular embrittlement in Fe-12Mn alloys
[DE83-002623] N83-31835
Lath martensites in low carbon steels
[DE83-002622] N83-31839
Technology for energy-efficient buildings
[DE83-005927] N83-31905
A simple multifunction discriminator for multichannel triggers
[DE83-004193] N83-31961
Analysis of field-performance data on shell-and-tube heat exchangers in geothermal service
[DE83-001564] N83-32014

Convection coefficients at building surfaces
[DE83-002572] N83-32015
Convective heat transfer in buildings: Recent research results
[DE83-015706] N83-32017
Turbulent boundary layer over a flat plate with strong stepwise heating
[DE83-001554] N83-32018
Development of ferritic weldments for grain-refined ferritic steels for 4.2K service
[DE83-009059] N83-32072
Emission characteristics of a medium-speed diesel using water-emulsified residual fluids
[DE83-001552] N83-32073
New developments in acid precipitation research
[DE83-000495] N83-32197
Ideas on the unification of radiobiological theories
[DE83-004188] N83-32283
Mathematical representation of size and electronic factors
[DE83-004182] N83-32455
Some experiments in low-temperature thermometry
[DE83-004179] N83-32510
Permanent magnet undulators
[DE83-003590] N83-32511
Large scale superfluid practice
[DE83-001563] N83-32513
Research needs of the new accelerator technologies
[DE83-000518] N83-32541
Collective effect accelerators and the challenge of attaining ultra-high energies
[DE83-002566] N83-32542
Mode specificity in unimolecular reaction dynamics
[DE83-0001932] N83-32546
Topics in phenomenology of unified gauge theories of weak, electromagnetic, and strong interactions
[DE83-004241] N83-32554
Four pi physics with the plastic ball
[DE83-004190] N83-32556
Thermal impact of waste emplacement and surface cooling associated with geologic disposal of nuclear waste
[DE83-007314] N83-32565
Design considerations for a high-spatial-resolution positron camera with dense-drift-space MWPC's
[DE83-003051] N83-32590
Luminosity of continuous beams with crossing angle
[DE83-003279] N83-32593
Cross-sectional transmission electron microscopy of semiconductors
[DE83-003662] N83-32627
Fundamental limits on SQUID technology
[DE83-002561] N83-32629
High-purity germanium crystal growing
[DE83-004181] N83-32632
Thermal-gradient migration of brine inclusions in salt crystals
[DE83-004180] N83-32633
Therymodynamic properties of strongly nonideal fluid mixtures from an xtended quasi-chemical theory
[DE83-004295] N83-32645

CALIFORNIA UNIV., DAVIS.
Design and implementation of multi-input adaptive signal extractions
[AD-A127036] N83-31963

CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
Computerized ultrasonic scanning bridge for defect imaging: Composite materials
[DE83-001539] N83-31741
Development of data-acquisition-and-analysis systems for in-beam gamma-ray spectroscopy: A study of the nucleus 180W
[DE83-004992] N83-31781
Microstructural characterization of nuclear-waste ceramics
[DE83-000362] N83-31860
Brownian-dynamics computer simulations of one dimensional polymer model. 1: Simple potentials
[DE83-002468] N83-31877
Three-dimensional computer modeling of electromagnetic fields: A global-lookback lattice-truncation scheme
[DE83-006583] N83-31949
Deconvolution of noisy transient signals: A Kalman filtering application
[DE83-030849] N83-31950
Accurate, practical simulation of satellite infrared radiometer spectral data
[DE83-002506] N83-32221
Airborne-temperature-survey maps of heat-flow anomalies for exploration geology
[DE82-019111] N83-32224
A scavenging model for stratified precipitation
[DE83-003374] N83-32242
Timing and control monitor system requirements
[DE83-005343] N83-32246
Frequency response of finite-aperature sample-and-hold systems
[DE83-002279] N83-32348
Electronics Engineering Department Computer Program Newsletter no. 8: Image-Processing Computer Codes
[DE83-007768] N83-32392
Preliminary investigation of interconnected systems interactions for the safety injection system of Indian Point-3
[DE83-009172] N83-32451
Atomic-vapor-laser isotope separation
[DE83-003253] N83-32530
Influence of centering forces on IFR hose instability
[DE83-006719] N83-32536
Rheology via nonequilibrium molecular dynamics
[DE83-004302] N83-32558
Thermonuclear model for high energy transients
[DE83-002814] N83-32566
Disposal costs for SRP high-level wastes in borosilicate glass and crystalline ceramic waste forms
[DE83-003105] N83-32567
ZAPP: Z-pinch atomic physics program
[DE83-005390] N83-32606
Fusion-power demonstration
[DE83-010370] N83-32609

CALIFORNIA UNIV., LOS ANGELES.
The smallest superharmonic majorant and its relation to the existence of entire functions of the exponential type playing the role of multiplier N83-32333

CALIFORNIA UNIV., RIVERSIDE.
Viral control of nuisance blue-green algae. Part 2: Cyanophage strains, stability studies of phages and hosts, and effects of environmental factors on phage-host interactions
[PB83-178129] N83-32200

CALIFORNIA UNIV., SAN DIEGO.
Fundamental combustion experiments in microgravity N83-31666
Evaluating the detectability of Gaussian stochastic signals by steepest-descent integration
[AD-A127604] N83-32419

CALIFORNIA UNIV., SAN DIEGO, LA JOLLA.
High efficiency picosecond pulse generation in the 675-930 NM region from a dye laser synchronously pumped by an argon-ion laser
[AD-A128033] N83-32058
Picosecond X-ray generation from picosecond photoelectron pulses
[AD-A128031] N83-32586

CALIFORNIA UNIV., SANTA BARBARA.
LANDSAT-D investigations in snow hydrology
[E83-10382] N83-32135
LANDSAT-D investigations in snow hydrology
[E83-10388] N83-32141
Snow reflectance from thematic mapper
[E83-10391] N83-32144

CALSPAN ADVANCED TECHNOLOGY CENTER, BUFFALO, N.Y.
IR and visible wavelength obscuration by pyrotechnically generated alkali-halide smokes
[AD-A127616] N83-32581

CAMBRIDGE UNIV. (ENGLAND).
Experimental observations of shear patterns in direct shear tests
[PB83-187351] N83-31917
Elastic fields under a spherical indenter
[AD-A127732] N83-32103

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
A post-processing algorithm for time domain pitch trackers
[AD-A127671] N83-31934
Discretization and solution techniques for Navier-Stokes and transonic flow problems
[AD-A127944] N83-32002
Exceptional memory
[AD-A126977] N83-32307
A case study in writing efficient programs
[AD-A127572] N83-32376
A two-level pipelined systolic array for multi-dimensional convolution
[AD-A127544] N83-32434

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO.
Numerical solutions of floating-zone thermocapillary flows N83-31675
Keywork-in-context index to computers in dentistry
[PB83-186361] N83-32674

CENTRAL ELECTRICITY GENERATING BOARD, LONDON (ENGLAND).
Safety engineering: KTA code of practice. Lifting mechanisms in nuclear plant
[BLL-CE-TRANS-7880-(9022.09)] N83-31898

CENTRAL ELECTRICITY RESEARCH LABS., LEATHERHEAD (ENGLAND).
Electrolyte solutions near the critical point of water: A review and proposal for studies under microgravity conditions N83-31698

CENTRE NATIONAL D'ETUDES SPATIALES, TOULOUSE (FRANCE).
Isothermal gradient heat-pipes space furnace (500 to 1000 deg C) N83-31659

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, GRENOBLE (FRANCE).
Minizone image furnace N83-31658

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, MEUDON (FRANCE).
On thermally-driven movement of drops in microgravity conditions N83-31645

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, PARIS (FRANCE).
The A-stars: Problems and perspectives. Monograph series on nonthermal phenomena in stellar atmospheres
[NASA-SP-463] N83-32693

CER CORP., LAS VEGAS, NEV.
Geology and engineering characteristics of selected low-permeability gas sands: A survey
[PB83-195099] N83-32230

CESKOSLOVENSKA AKADEMIE VED, PRAGUE.
On the nucleation of melts under microgravity conditions N83-31649

CHERRYWOOD FARMS, WILLIAMSBURG, MICH.
Project demonstration of wind turbine electricity: Interconnecting a northern Michigan fruit farm with a major utility
[DE83-001387] N83-31984

CHRISTIAN MICHELSENS INSTITUTT FOR VIDENSKAP OG ANDSFRIHET, BERGEN (NORWAY).
Numerical simulation of turbulent flame and pressure development in gas explosions
[PB83-177832] N83-31790
Large-scale experiments on turbulent flame and pressure development
[PB83-177840] N83-31791
Electric spark sensitivity profile of explosible/combustible systems
[PB83-177865] N83-31792
Transmission of an explosion through an orifice N83-32024
Blast wave decay from an exploding hemispherical gas cloud
[PB83-177857] N83-32025
Satellite transmission of ODAS-451 data during July and August 1982
[PB83-183632] N83-32253
ODAS-450 transmission regularity and meteorological data representativity
[PB83-183731] N83-32254
ODAD-451 data buoy in the north-east Atlantic (61 deg 36'N, 13 deg 24'W)
[PB83-183806] N83-32275

CITY COLL. OF THE CITY UNIV. OF NEW YORK.
Exponential approximations for two classes of aging distributions
[AD-A127924] N83-32463

CITY OF TALLAHASSEE, FLA.
Alternate fuels and energy sources for electric department: City of Tallahassee, Florida
[DE83-001694] N83-31889

COAST GUARD RESEARCH AND DEVELOPMENT CENTER, GROTON, CONN.
An evaluation of SARP (search and rescue planning system) drift predictions using satellite-tracked drift-buoys
[AD-A127987] N83-31588

COLORADO STATE UNIV., FORT COLLINS.
Structure and phase transitions of liquid crystals
[AD-A127573] N83-32617

COLORADO UNIV., BOULDER.
Flow of gas-particle mixtures
[AD-A127466] N83-32001

COLUMBIA UNIV., NEW YORK.
Determination of the angular and energy dependence of hard constituent scattering from pi-O pair events at the CERN intersecting storage rings
[DE83-002451] N83-32538
Search for new heavy techniparticles
[DE83-003945] N83-32551
A program of ground-based astronomy to complement Einstein observations
[AD-A127148] N83-32691

COMBUSTION ENGINEERING, INC., WINDSOR, CONN.
High-temperature elastic-plastic and creep properties for SA533 Grade B Class I and SA508 materials
[DE83-901103] N83-32114

COMMISSARIAT A L'ENERGIE ATOMIQUE, GRENOBLE (FRANCE).
New features of the European microgravity programs N83-31639

Technical implications of a flight experiment design N83-31657
Implications of the lack of wetting at the monotectic growth front N83-31680
Order of magnitude analysis of solute macrosegregation in crystal growth from the melt N83-31683

COMMISSARIAT A L'ENERGIE ATOMIQUE, SACLAY (FRANCE).
Critical point phenomena in fluids N83-31695

COMMITTEE ON APPROPRIATIONS (U. S. HOUSE).
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-32680
Space flight, control and data communications N83-32681

COMMITTEE ON APPROPRIATIONS (U. S. SENATE).
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984
[S-REPT-98-152] N83-32678
National Aeronautics and Space Administration research and development N83-32679

COMMITTEE ON FOREIGN AFFAIRS (U. S. HOUSE).
Oversight of the UNISPACE Conference
[GPO-14-255] N83-31633

COMMITTEE ON FOREIGN RELATIONS (U. S. SENATE).
Global trends in population and resources
[GPO-96-841] N83-32149

COMMITTEE ON SCIENCE AND TECHNOLOGY (U. S. HOUSE).
Deforestation: Environmental impact and research needs
[GPO-12-976] N83-32192
Measures to address the impact of computer technology on lesser developed countries
[GPO-99-819] N83-32343
Authorization for National Oceanic and Atmospheric Administration for fiscal years 1984 and 1985
[H-REPT-98-135-PT-1] N83-32682
Department of Energy Civilian Research and Development Authorization Act for fiscal year 1984
[H-REPT-98-81] N83-32683
Authorizing appropriations to the National Science Foundation
[H-REPT-98-73] N83-32684
Technical Information Clearinghouse Fund Act of 1983
[H-REPT-98-94] N83-32685
Technology and handicapped people
[GPO-12-921] N83-32686

COMMITTEE ON SMALL BUSINESS (U. S. HOUSE).
Urea-formaldehyde foam insulation
[GPO-12-485] N83-32191

COMPTROLLER GENERAL OF THE UNITED STATES, WASHINGTON, D.C.
Better use of information technology can reduce the burden of federal paperwork
[GAO/GGD-83-39] N83-32655
Implementing the Paperwork Reduction Act: Some progress, but many problems remain
[GAO/GGD-83-35] N83-32656

CONNECTICUT UNIV., STORRS.
A collision resolution protocol with limited channel sensing: Finitely many users
[AD-A128501] N83-31948

COOPERATIVE INST. FOR RESEARCH IN ENVIRONMENTAL SCIENCE, BOULDER, COLO.
Deterministic methods of seismic source identification
[AD-A127477] N83-32211

CORNELL UNIV., ITHACA, N. Y.
Time resolved study of primary decomposition process for nitro paraffins and nitramines
[AD-A127660] N83-31748
Computer-aided design and fabrication of molds and computer control of injection molding
[PB83-187955] N83-31914
Analysis of NOAA/Alaskan MST radar data
[AD-A127023] N83-31927
Energy disposal in electronically excited halogens and oxygen
[AD-A127585] N83-32051

COUNCIL FOR MINERAL TECHNOLOGY, RANDBURG (SOUTH AFRICA).
Review of corrosion inhibitors: Theory and practice
[PB83-181487] N83-31853

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, PRETORIA (SOUTH AFRICA).
Electrochemical mass transfer to parallel plates with and without turbulence promoters: Simulation of plate heat exchanger configurations
[PB83-183145] N83-31794

D

DARTMOUTH COLL., HANOVER, N.H.
The brittle to ductile transition in polycrystalline ice under tension
[AD-A127701] N83-32102

DAYTON UNIV., OHIO.
A computer simulation of aircraft evacuation with fire
[NASA-CR-166511] N83-31586
Structural element and real blade impact testing, volume 1
[AD-A127744] N83-31606
Structural element testing and real blade impact testing, volume 2
[AD-A127957] N83-31738
Improved materials for composite and adhesive joints
[AD-A128569] N83-31739
Spectrometer sensitivity investigations on the spectrometric oil analysis program
[AD-A127969] N83-31752
Relationship between manufacturing yields and field failure rates of electronic equipment
[AD-A128498] N83-32078
A model for the surface wind field in complex terrain
[AD-A127030] N83-32234
The 4th Symposium on Applied Surface Analysis: Parts 1 and 2
[AD-A127109] N83-32615

DECISIONS AND DESIGNS, INC., MCLEAN, VA.
Development of teleconferencing methodologies with emphasis on virtual space video and interactive graphics
[AD-A127738] N83-31935

DELAWARE UNIV., NEWARK.
Evaluation of spatial, radiometric and spectral thematic mapper performance for coastal studies
[E83-10386] N83-32139
Wind effects on longitudinal dispersion in open-channel flows
[PB83-179697] N83-32251
Algorithmic methods in probability
[AD-A128536] N83-32475
Alfven waves in the solar wind in association with solar energetic particles: Sunspot umbral origin
[AD-A128046] N83-32701

DEPARTMENT OF ENERGY, WASHINGTON, D. C.
Stopping powers and ranges of electrons and positrons
[PB83-175687] N83-32562
Magnetic fusion energy and computers. The role of computing in magnetic fusion energy research and development
[DE83-006565] N83-32599

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, COLOGNE (WEST GERMANY).
Particle transport induced by directional solidification N83-31642
Thermocapillary migration of bubbles in liquids showing relaxation of surface tension N83-31643
The behavior of a metallic dispersion under microgravity conditions N83-31647
Scientific goals of the D1-mission N83-31650
Thermal conductivity measurement on fluids under microgravity using holographic interferometry N83-31699

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, GOETTINGEN (WEST GERMANY).
Free-surface vibration of a floating zone induced by surface tension driven oscillating flow N83-31670

DEUTSCHE GOLD- UND SILBER-SCHEIDEANSTALT, FRANKFURT AM MAIN (WEST GERMANY).
Recovery of precious metals from materials containing selenium, tellurium, arsenic and antimony
[BMFT-FB-T-83-050] N83-31848
Development of molten salt baths for the electrodeposition of gold and gold alloys
[BMFT-FB-T-83-051] N83-31849

DIJON UNIV. (FRANCE).
The density of the leaves of certain Pfaff equations with two variables N83-32337

DORNIER-WERKE G.M.B.H., FRIEDRICHSHAFEN (WEST GERMANY).
Heat transfer induced performance characteristics of gradient type furnaces N83-31654
An automatic monoellipsoidal mirror furnace facility for long-term crystal growth on the European Retrievable Carrier (EURECA) N83-31655

DOUGLAS AIRCRAFT CO., INC., LONG BEACH, CALIF.
Advanced composite vertical stabilizer for DC-10 transport aircraft
[NASA-CR-172780] N83-31595

DRAPER (CHARLES STARK) LAB., INC., CAMBRIDGE, MASS.
Flexible manufacturing system handbook. Volume 1: Executive summary
[AD-A127927] N83-31899
Flexible manufacturing system handbook. Volume 2: Description of the technology
[AD-A127928] N83-31900
Flexible manufacturing system handbook. Volume 3: Buyer/user's guide
[AD-A127929] N83-31901
Flexible manufacturing system handbook. Volume 4. Appendices
[AD-A127930] N83-31902
Design Aids for Real-Time Systems (DARTS) N83-32363

DREXEL UNIV., PHILADELPHIA, PA.
Fracture behavior of boron aluminum composites at room and elevated temperatures
[AD-A127492] N83-31737
Use of acoustic emissions to predict ground stability
[PB83-178764] N83-31911

DU PONT DE NEMOURS (E. I.) AND CO., AIKEN, S.C.
Heat treating effects on environmental hydrogen embrittlement of nickel
[DE83-004921] N83-31844
Orientation study of northern Arkansas. National uranium resource evaluation program. Hydrogeochemical and stream-sediment reconnaissance
[DE83-001214] N83-32156
Hydrogeochemical and stream sediment reconnaissance, orientation study of central Louisiana: National uranium resource evaluation program
[DE83-001217] N83-32157

DUKE UNIV. BEAUFORT, N.C.
Detection of retinal ischemia prior to blackout by electrical evoked cortical responses
[AD-A126855] N83-32288

DUKE UNIV., DURHAM, N. C.
A result on the computational complexity of heuristic estimates for the A algorithm
[AD-A127901] N83-32411

E

E-SYSTEMS, INC., ST. PETERSBURG, FLA.
A 500-watt solid-state RF power amplifier AM-7209( )/VRC
[AD-A127462] N83-31965

EARTH SATELLITE CORP., CHEVY CHASE, MD.
Geologic exploration: The contribution of LANDSAT-4 thematic mapper data
[E83-10387] N83-32140
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration
[E83-10389] N83-32142

ECOLE NATIONALE SUPERIEURE D'ELECTROCHIMIE ET D'ELECTROMETALLURGIE, GRENOBLE (FRANCE).
Measurements of diffusion coefficient of copper in liquid lead in microgravity by the grain boundary grooving technique N83-31684

ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (SWITZERLAND).
Aeroelasticity in turbomachine-cascades
[AD-A127709] N83-31605

EDGERTON, GERMESHAUSEN AND GRIER, INC., GOLETA, CALIF.
Recent developments in thick mercuric iodide spectrometers
[DE83-003007] N83-32037

EDGERTON, GERMESHAUSEN AND GRIER, INC., IDAHO FALLS, IDAHO.
The CRT display evaluation: The multidimensional rating of CRT-generated displays
[DE83-003699] N83-31979
Characteristics and use of the transient reactivity meter
[DE83-003726] N83-32040

EHRENKRANTZ GROUP, WASHINGTON, D.C.
Energy conservation for housing: A workbook
[PB83-185330] N83-32186

ELECTRICITY COUNCIL, LONDON (ENGLAND).
Electro-chemical synthesis of organo-metallic nickel compounds
[BLL-OA-TRANS-3018-(6196.3)] N83-31797

ELECTRICITY COUNCIL RESEARCH CENTRE, CAPENHURST (ENGLAND).
Austenitic thermochemical treatments in a glow discharge
[PB83-184671] N83-31852
Development of a plasma carburizing process
[PB83-186692] N83-31913

Low cost harmonic analyser for the distribution network
[PB83-184697] N83-31992
Negative phase sequence recorder based on a single chip microcomputer
[PB83-184689] N83-32043

ELECTRO MAGNETIC APPLICATIONS, INC., ALBUQUERQUE, N. MEX.
The effects of corona and angle of arrival on the EMP response of cables lying on the surface of the Earth
[AD-A127060] N83-31928

EMMANUEL COLL., BOSTON, MASS.
Variation of equatorial F-region irregularity parameters as a function of solar activity
[AD-A127895] N83-32209

ENVIRONMENTAL PROTECTION AGENCY, ANN ARBOR, MICH.
Preliminary perspective on pure methanol fuel for transportation
[PB83-180232] N83-31892

ERLANGEN-NUREMBERG UNIV. (WEST GERMANY).
Investigation of convective flows in model systems of directional solidification configurations N83-31682

ERNO RAUMFAHRTTECHNIK G.M.B.H., BREMEN (WEST GERMANY).
Development of advanced heating facility concepts for microgravity application N83-31653

EUROPEAN OFFICE OF AEROSPACE RESEARCH AND DEVELOPMENT, LONDON (ENGLAND).
Determination of the angular and energy dependence of hard constituent scattering from pi-O pair events at the CERN intersecting storage rings
[DE83-002451] N83-32538
Charge correlations in deep inelastic proton-proton interactions at the CERN ISR: The axial field spectrometer collaboration
[DE83-002324] N83-32539

EUROPEAN SPACE AGENCY, PARIS (FRANCE).
Materials Sciences Under Microgravity
[ESA-SP-191] N83-31637

EUROPEAN SPACE RESEARCH AND TECHNOLOGY CENTER, NOORDWIJK (NETHERLANDS).
The fluid physics module: New possibilities and applications N83-31651
Sounding-rocket flight test of an acoustic mixer by manufacture of a lead-zinc emulsion alloy in microgravity N83-31652

EXXON RESEARCH AND ENGINEERING CO., LINDEN, N.J.
Shunt current control methods in electrochemical systems applications
[DE83-004015] N83-31769

F

FAUSKE AND ASSOCIATES, INC., BURR RIDGE, ILL.
Melt fingers and pool penetration into a miscible substrate
[DE83-004511] N83-31768

FEDERAL AVIATION ADMINISTRATION, ATLANTIC CITY, N.J.
Engine performance comparison associated with carburetor icing during aviation grade fuel and automotive grade fuel operation
[DOT/FAA/CT-82/110] N83-31604

FERMI NATIONAL ACCELERATOR LAB., BATAVIA, ILL.
High energy electromagnetic shower position measurement by a fine grained scintillation hodoscope
[DE83-000082] N83-31951
Production of high-transverse-energy events in p-nucleus collisions at 400 GeV/c
[DE83-002099] N83-32547
Measurement of strange quark suppression in hadronic vacuum
[DE83-000918] N83-32548
Psi prime photoproduction at a mean energy of 150 GeV
[DE83-000686] N83-32549

FLORIDA UNIV., GAINESVILLE.
Evapotranspiration estimates based on surface temperature and net radiation: Development of remote sensing methods
[PB83-175307] N83-32163
Sleep deprivation and performance: The optimum use of limited sleep periods
[AD-A126934] N83-32291
Adaptation of computer program for Pourbaix diagrams to personal computers
[AD-A128259] N83-32385

FLUIDYNE ENGINEERING CORP., MINNEAPOLIS, MINN.
Preliminary engineering study: Quick opening valve MSFC high Reynolds number wind tunnel
[NASA-CR-170845] N83-31612

FRACTURE CONTROL CORP., GOLETA, CALIF.
Reconstituted Charpy impact specimens
[DE83-901113] N83-32113

G

GARRETT CORP., TORRANCE, CALIF.
Adaptive reference voltage generator for firing angle control of line-commutated inverters
[NASA-CASE-MFS-25215-1] N83-31953

GELLES (S. H.) ASSOCIATES, COLUMBUS, OHIO.
Low-gravity experiments on Liquid Phase Miscibility Gap (LPMG) alloys: Materials Experiments Assembly (MEA) N83-31685

GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.
Potential joint civil and military use of military airfields
[PB83-186734] N83-31616
Water conservation: An update of federal activity N83-32148
Information on ocean disposal of municipal and industrial waste
[GAO/RCED-83-161] N83-32190
Automation in the workplace, its impact on the labor force, and the role of labor market planning for policymaking N83-32312
Federal agencies could save time and money with better computer software alternatives
[GAO/AFMD-83-29] N83-32350
Regional low-level radioactive waste disposal sites: Progress being made but new sites will probably not be ready by 1986
[GAO/RCED-83-48] N83-32563
Status of DOE's implementation of the magnetic fusion energy engineering act of 1980
[GAO/RCED-83-105] N83-32594

GENERAL ELECTRIC CO., CINCINNATI, OHIO.
Control means for a gas turbine engine
[NASA-CASE-LEW-14586-1] N83-31603

GENERAL ELECTRIC CO., HUNTSVILLE, ALA.
Analysis and calculation of macrosegregation in a casting ingot, exhibit D
[NASA-CR-170846] N83-31818

GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
Fabricate indium-antimonide two-dimensional charge injection device array
[AD-A127638] N83-32618

GENERAL ELECTRIC CO., ST. PETERSBURG, FLA.
Internal motion in high vacuum systems
[DE83-001417] N83-31906

GENOA UNIV. (ITALY).
Reconstruction by multidirectional holographic interferometry of the concentration field in a supersaturated solution near a growing NaClO3 crystal N83-31660

GEOLOGICAL SURVEY, CHAMPAIGN, ILL.
Paleozoic geology of the New Madrid area
[DE83-900300] N83-32223

GEOLOGICAL SURVEY, INDIANAPOLIS, IND.
Ground-water resources of the White River Basin, Hamilton and Tipton Counties, Indiana
[PB83-184309] N83-32169

GEOLOGICAL SURVEY, IOWA CITY, IOWA.
Regional tectonics and seismicity of southwestern Iowa
[DE83-900978] N83-32226

GEOLOGICAL SURVEY, RESTON, VA.
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E83-10373] N83-32128
A preliminary evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies
[E83-10383] N83-32136
Evaluation of potential surface faulting and other tetonic deformation
[DE83-900503] N83-32222

GEOLOGICAL SURVEY, ST. PAUL, MINN.
Preliminary evaluation of the ground-water-flow system in the Twin Cities metropolitan area, Minnesota
[PB83-174599] N83-32162

GEOLOGICAL SURVEY, UNIVERSITY, ALA.
Alabama coastal region ecological characterization. Volume 1: Coastal bibliography
[PB83-180661] N83-32202

GEORGIA INST. OF TECH., ATLANTA.
Evaluation of design criterion of the strategic expeditionary landing field
[AD-A128323] N83-31614
Combustion dynamics in rockets
[AD-A127129] N83-31721
Anaerobic treatment of gasified effluents
[DE83-001864] N83-31786
Saturated tearing modes in Tokamaks with divertors
[DE83-005589] N83-32598

GESELLSCHAFT FUER SCHWERIONENFORSCHUNG M.B.H., DARMSTADT (WEST GERMANY).
Four pi physics with the plastic ball
[DE83-004190] N83-32556

GIESSEN UNIV. (WEST GERMANY).
Measurement of the critical Marangoni number in a floating zone under reduced gravity N83-31671

GOLDER ASSOCIATES, INC., BELLEVUE, WASH.
Relationship of an in-situ test facility to a deep geologic repository for high-level nuclear waste, task 4
[DE83-901818] N83-31726

GRENOBLE UNIV. (FRANCE).
Annals of the Fourier Institute, volume 33, number 1
[ISSN-0373-0956] N83-32329
Invariants of a maximal unipotent subgroup of a semi-simple group N83-32330

GRONINGEN RIJKSUNIVERSITEIT (NETHERLANDS).
Etale covering of a Mumford curve N83-32331

GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
Fusion-power demonstration
[DE83-010370] N83-32609

H

HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
Assessment of spent-fuel waste-form/stabilizer alternatives for geologic disposal
[DE83-002458] N83-32573

HARRY DIAMOND LABS., ADELPHI, MD.
A catalog of fluidic C-format laminates
[AD-A128549] N83-31740
Environmental standards for electro-optical systems
[AD-A127776] N83-32588

HAWAII INST. OF GEOPHYSICS, HONOLULU.
Oceanic Pn/Sn phases: A qualitative explanation and reinterpretation of the T-phase
[AD-A128343] N83-32266

HAWAII UNIV., MANOA.
Natural landmarks survey of the islands of the Pacific
[PB83-182501] N83-32161

HIGH ORDER SOFTWARE, CAMBRIDGE, MASS.
POD-HOS (Performances Oriented Design-Higher Order Software) interfaces: An examination of AXES/POD relationships and other issues
[AD-A128301] N83-32384

HITACHI LTD., TOKYO (JAPAN).
Interplanetary mission designs by multiple Earth-Venus-Jupiter swingbys N83-32489
Optimization of low thrust trajectories for collinear Lagrange point mission N83-32490
Recent developments in the investigations on the gas-surface interactions N83-32499

HOECHST A.G., FRANKFURT AM MAIN (WEST GERMANY).
High efficiency ozone absorption in organically polluted water (downflow column)
[BMFT-FB-T-83-056] N83-32199

HONEYWELL, INC., MINNEAPOLIS, MINN.
Demonstration Advanced Avionics System (DAAS), phase 1
[NASA-CR-166503] N83-31602

HOUSTON STATE PSYCHIATRIC INST., TEX.
Evoked potential studies of the effects of impact acceleration on the motor nervous system
[AD-A127562] N83-32278

HOUSTON UNIV., TEX.
Nondestructive stress measurements in aluminum
[AD-A127699] N83-31823

HUGHES AIRCRAFT CO., CULVER CITY, CALIF.
Development of phosphorylated adhesives
[NASA-CR-166507] N83-31724

HUGHES AIRCRAFT CO., EL SEGUNDO, CALIF.
Study of the causes of unnecessary removals of avionic equipment
[AD-A127546] N83-31570

HUGHES RESEARCH LABS., MALIBU, CALIF.
Real-time implementation of nonlinear optical processing functions
[AD-A127024] N83-32579

I

IBM FEDERAL SYSTEMS DIV., GAITHERSBURG, MD.
Estimates of software size from state machine designs N83-32368

IBM FEDERAL SYSTEMS DIV., HOUSTON, TEXAS.
Maintenance estimation methodology N83-32367

IBM RESEARCH LAB., SAN JOSE, CALIF.
Holographic methods for the investigation of photophysical properties
[AD-A128510] N83-32032

IDAHO NATIONAL ENGINEERING LAB., IDAHO FALLS.
Environmental evaluation of alternatives for long-term management of Defense high-level radioactive wastes at the Idaho Chemical Processing Plant
[DE83-002504] N83-32572
Conceptual design report for a fusion engineering device
[DE83-002288] N83-32602
IDAHO UNIV., MOSCOW.
Remote sensing determination of hydrograph recession characteristics
[PB83-186627] N83-32170
Use of remote sensing techniques and the universal soil loss equation to determine soil erosion
[PB83-182006] N83-32172
ILLINOIS STATE WATER SURVEY, URBANA.
Low level convergence and the prediction of convective precipitation
[AD-A127673] N83-32236
ILLINOIS UNIV., CHICAGO.
Two orthogonal (v/2)x2v F-rectangle for all even v
[AD-A127948] N83-32433
A class of multivariate new better than used processes
[AD-A127535] N83-32469
Characterizations of multivariate classes of life distributions
[AD-A127783] N83-32471
ILLINOIS UNIV., URBANA.
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible
[AD-A128534] N83-32062
Fracture of hot-pressed silicon nitride at elevated temperatures
[DE83-005236] N83-32117
Illinois I/O register to FASTBUS interface
[DE83-007330] N83-32389
Research on a new type of negative hydrogen ion source
[AD-A127947] N83-32525
Burn dynamic experiment based on the field-reversed theta pinch
[DE83-005071] N83-32607
Effect of pressure on the resistivity and Hall coefficient of amorphous metallic alloys
[DE83-005399] N83-32631
ILLINOIS UNIV., URBANA-CHAMPAIGN.
An expert distributed robotics system with comprehension and learning abilities in the aircraft flight domain
[AD-A127739] N83-32401
IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).
Application of the ESCIMO theory to turbulent diffusion flames
[CFD/82/7] N83-32023
INDIANA STATE DEPT. OF NATURAL RESOURCES, INDIANAPOLIS.
Ground-water resources of the White River Basin, Hamilton and Tipton Counties, Indiana
[PB83-184309] N83-32169
INDIANA UNIV., BLOOMINGTON.
An interface tracking algorithm for the porous medium equation
[AD-A127685] N83-32422
INFORMATICS GENERAL CORP., PALO ALTO, CALIF.
Improved method for transonic airfoil design-by-optimization
[NASA-CR-166497] N83-31578
INSTITUTE FOR DEFENSE ANALYSES, ALEXANDRIA, VA.
Evaluation of infrared target discrimination algorithms
[AD-A128283] N83-32587
INSTITUTE OF GAS TECHNOLOGY, CHICAGO, ILL.
Coal-gasification research studies
[DE83-006604] N83-31763
INSTITUTE OF OCEANOGRAPHIC SCIENCES, BIRKENHEAD (ENGLAND).
The West Coast surge prediction experiment 1981-82
[IOS-150] N83-32273
INSTITUTE OF OCEANOGRAPHIC SCIENCES, WORMLEY (ENGLAND).
Intraplate seismicity and seismic risk in the Atlantic Ocean based on teleseismically observed earthquakes
[IOS-136] N83-32227
Estimation of wave spectra from wave height and period
[IOS-135] N83-32271
A new method for the analysis of extremes applicable to one year's data
[IOS-142] N83-32272
INSTITUTE OF SPACE AND ASTRONAUTICAL SCIENCE, TOKYO (JAPAN).
Proceedings of the Symposium on Mechanics for Space Flight
[ISAS-SP-1] N83-32480
Attitude control experiment of sounding rocket S-520-5 N83-32491
INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
A translational registration system for LANDSAT image segments
[E83-10373] N83-32126
CNPQ/INPE LANDSAT system
[E83-10374] N83-32127
Preliminary statistical studies concerning the Campos RJ sugar cane area, using LANDSAT imagery and aerial photographs
[E83-10384] N83-32137
Application of MSS/LANDSAT images to the structural study of recent sedimentary areas: Campos Sedimentary Basin, Rio de Janeiro, Brazil
[E83-10385] N83-32138
INTERNATIONAL TELEPHONE AND TELEGRAPH CORP., SECAUCUS, N.J.
Customer premises services market demand assessment 1980 - 2000: Volume 2
[NASA-CR-168151] N83-31926
IOWA STATE UNIV. OF SCIENCE AND TECHNOLOGY, AMES.
Metal clusters and extended metal-metal bonding in metal oxide systems
[DE83-003793] N83-31821
Halide and chalcogenide clusters of the early transition metals
[DE83-003792] N83-31841
Proline metabolism in plants under environmental stresses
[DE83-002735] N83-32284
ISRAEL AIRCRAFT INDUSTRIES LTD., TEL-AVIV.
Low cost satellite for fast interactive graphics in a time-sharing environment
[PB83-187336] N83-32396

J

JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
Hydrodesulfurization of chlorinized coal
[NASA-CASE-NPO-15304-1] N83-31743
Method and apparatus for producing gas-filled hollow spheres
[NASA-CASE-NPO-14596-3] N83-31896
Cycling Joule Thomson refrigerator
[NASA-CASE-NPO-15251-1] N83-31897
Multibeam single frequency synthetic aperture radar processor for imaging separate range swaths
[NASA-CASE-NPO-14525-2] N83-31918
Synchronized voltage contrast display analysis system
[NASA-CASE-NPO-14567-1] N83-31919
Method and device for detection of a substance
[NASA-CASE-NPO-14940-1] N83-31954
System for monitoring physical characteristics of fluids
[NASA-CASE-NPO-15400-1] N83-31993
Satellite Data Distribution System (SDDS). The development and demonstration of new fisheries support products based on remote ocean sensing from satellites
[E83-10399] N83-32147
Cloud cover sensor
[NASA-CASE-NPO-14936-1] N83-32232
Distributed multiport memory architecture
[NASA-CASE-NPO-15342-1] N83-32342
Acoustic system for material transport
[NASA-CASE-NPO-15453-1] N83-32515
System for controlled acoustic rotation of objects
[NASA-CASE-NPO-15522-1] N83-32516
JOCHI UNIV., TOKYO (JAPAN).
Characteristic Cauchy problems and solutions of formal power series N83-32335
JOHNS HOPKINS UNIV., BALTIMORE, MD.
Small groups programmed environments: Behavioral and biological interactions
[NASA-CR-172853] N83-32306
JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.
USSR report: Space, no. 23
[JPRS-83994] N83-31617
Zaytsev comments on modular orbital stations N83-31618
Commentary on Soyuz T-8 rendezvous failure N83-31619
Salyut-7 passes one year in orbit mark N83-31620
Ryumin interviewed on Salyut experiments N83-31621
Star City astronaut training center N83-31622
Cosmonaut training simulators at Zvezdnyy Gorodok described N83-31623
Commentary on Astron satellite N83-31624
Discussion of Halley's comet projects N83-31625
Flight control center's history, functions spotlighted N83-31626
Interaction of solar wind with magnetosphere of Venus N83-31627
Commentaries on successful plant growing experiments on Salyut-7 N83-31628
Rendezvous in space N83-31629
Space survey techniques benefit geology N83-31630
Jurist comments on legal questions regarding US shuttle N83-31631
USSR report: Earth sciences, no. 26
[JPRS-83622] N83-32121
Drilling at accesses to Earth's mantle N83-32122
USSR report: Earth sciences, no. 27
[JPRS-83829] N83-32123
Petrosyants interviewed on results of PIGAP program N83-32124
Automation of hydrophysical research N83-32125
USSR report: Science and technology policy, no. 9
[JPRS-82713] N83-32647
Methods discussed for accelerating adoption of scientific achievements N83-32648
Better results from development of technical equipment N83-32649
Results of comprehensive programs summarized N83-32650
Nondestructive quality control discussed N83-32651
Uses of information discussed N83-32652
Streamlining flow of scientific and technical information N83-32653
R&D acitivities of Belorussian SSR Academy of Sciences described N83-32654

K

KATHOLIEKE UNIVERSITEIT TE LEUVEN (BELGIUM).
Metallic composite materials and microgravity N83-31641
KENTRON INTERNATIONAL, INC., HAMPTON, VA.
A data base processor semantics specification package
[NASA-CR-172172] N83-32352
KEPLING AND ASSOCIATES, INC., TULSA, OKLA.
Evaluation of the North Stanley Polymer Demonstration Project
[DE83-006915] N83-31878
KLEIN, SCHANZIN UND BECKER A.G., FRANKENTHAL (WEST GERMANY).
Development and testing of a submersible motor pump driven by a solar cell generator
[BMFT-FB-T-83-081] N83-32074
KVB, INC., IRVINE, CALIF.
NO-x emissions from pulverized-coal arch-fired boilers
[DE83-901472] N83-32193
KYOTO UNIV. (JAPAN).
On condition (a sub f) of a stratified mapping N83-32336
Density measurements of a free jet by a laser differential interferometer N83-32497
Translation nonequilibrium in a rapid expansion flow from a high temperature source N83-32498
KYUSHU UNIV., FUKUOKA (JAPAN).
Generation of orthogonal, boby-fitted grids using potential flow solution by the panel method N83-32485

L

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY, PALISADES, N. Y.
Acoustic and gravity waves in the neutral atmosphere and the ionosphere, generated by severe storms
[NASA-CR-170834] N83-32205
LEADERSHIP AND MANAGEMENT DEVELOPMENT CENTER, MAXWELL AFB, ALA.
Management's role for reducing employee stress
[AD-A127126] N83-32659
LEHIGH UNIV., BETHLEHEM, PA.
Composition and electrical property relationships in polycrystalline inorganic materials
[AD-A127458] N83-31750
LIMBURGS UNIV., DIEPENBEEK (BELGIUM).
The germs of diffeomorphisms and of vector fields in the class of finite differentiability N83-32338
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
Coherent laser radar remote sensing
[AD-A127717] N83-32053
LOCKHEED ENGINEERING AND MANAGEMENT SERVICES CO., INC., HOUSTON, TEX.
LANDSAT data preprocessing
[E83-10380] N83-32133
Simulation of meteorological satellite (METSAT) data using LANDSAT data
[E83-10381] N83-32134

LOCKHEED-GEORGIA CO., MARIETTA.
New considerations on scale extrapolation of wing pressure distributions affected by transonic shock-induced separations
[NASA-CR-166426] N83-31597
LOCKHEED MISSILES AND SPACE CO., HUNTSVILLE, ALA.
Manufacturing in space: Fluid dynamics numerical analysis
[NASA-CR-172944] N83-31996
LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.
Buckling of steel containment shells. Task 4: Use of the PANDA program for simple buckling analyses of stiffened cylindrical shells
[DE83-900980] N83-32115
Buckling of steel-containment shells. Task 1B: Buckling of Washington Public Power Supply Systems' plant no. 2 containment vessel
[DE83-901036] N83-32118
LOCKHEED MISSILES AND SPACE CO., SUNNYVALE, CALIF.
Formulation and characterization of epoxy resin copolymer for graphite composites
[NASA-CR-166501] N83-31731
Fabrication of slender struts for deployable antennas
[NASA-CR-172164] N83-31733
LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Singular perturbation approach to flame theory with chain and competing reactions
[DE83-000642] N83-31772
Traveling-wave solutions to reaction-diffusion systems modeling combustion
[DE83-000603] N83-31773
Asymptotic flame theory with complex chemistry
[DE83-002077] N83-31774
Strain hardening of heavily cold-worked metals
[DE83-003544] N83-31840
Fault-current limiter using a superconducting coil
[DE83-003557] N83-31986
Conceptual designs for 100-MW space radiators
[DE83-003542] N83-32020
Laser-based instrumentation for the detection of chemical agents
[DE83-003538] N83-32036
Mini-MCA: An intelligent inspection instrument
[DE83-001979] N83-32038
Automated on-line L-edge measurement of SNM concentration for near-real-time accounting
[DE83-000666] N83-32039
Scattering by flaws in a slab or a half-space
[DE83-000637] N83-32080
Effects of microstructure on the speed and attenuation of elastic waves
[DE83-000671] N83-32116
Comparison of lateral and vertical diffusion in several valleys
[DE83-003570] N83-32198
SESAME '83: Report on the Los Alamos equation-of-state library
[DE83-006283] N83-32388
Deriving metrics for relating complexity measures to software maintenance costs
[DE83-000672] N83-32390
Eulerian-Lagrangian relationships in Monte Carlo simulations of turbulent diffusion
[DE83-003490] N83-32453
Use of Eulerian initial conditions in a Lagrangian model of turbulent diffusion
[DE83-003479] N83-32454
Development and application of the discrete ordinates-transfer matrix hybrid method for deterministic streaming calculations
[DE82-017387] N83-32457
Nonthermal ultrasoft X-ray spectra on ZT-40M
[DE83-007123] N83-32534
Laser-induced fluorescence detection of large organic molecules
[DE83-000353] N83-32540
High-brightness negative-hydrogen linear accelerator
[DE83-003565] N83-32545
Biological intrusion barriers for large-volume waste-disposal sites
[DE83-002061] N83-32571
Overview assessment of nuclear-waste management
[DE83-004472] N83-32574
Flight-systems safety program
[DE83-001916] N83-32575
Noncanonical Hamiltonian formulation of ideal magnetohydrodynamics
[DE83-000649] N83-32603
Adiabatic compression of elongated field-reversed configurations
[DE83-003533] N83-32604
The Antares facility for inertial-fusion experiments: Status and plans
[DE83-003536] N83-32608
Thin films from ammonia-borane
[DE83-003567] N83-32628
Current analysis for rotating and vibrating heavy nuclei
[DE83-000612] N83-32637
Gamma bursts
[DE83-004810] N83-32704
LUND UNIV. (SWEDEN).
Charge correlations in deep inelastic proton-proton interactions at the CERN ISR: The axial field spectrometer collaboration
[DE83-002324] N83-32539
LYON-1 UNIV., VILLEURBANNE (FRANCE).
Stationary and oscillatory instabilities for mixture subjected to Soret effect in vertical cylinder with axial temperature gradient N83-31661

M

MADRID UNIV. (SPAIN).
Buoyancy-thermocapillary convection: The role of interfacial deformation N83-31674
MAINE UNIV., ORONO.
Metal input and mobilization in 2 acid-stressed lake watersheds in Maine
[PB83-182022] N83-32201
Distribution of tidal bottom stress in a New Hampshire estuary
[PB83-184085] N83-32276
MANAGEMENT CONSULTING AND RESEARCH, INC., FALLS CHURCH, VA.
Summary of analysis of sources of forecasting errors in BP 1500 requirements estimating process and description of compensating methodology
[AD-A128548] N83-31574
POM (Program Objective Memorandum) FY-85 BP 1500 cost growth and leadtime adjustments: Research results
[AD-A128522] N83-32667
MARYLAND UNIV., COLLEGE PARK.
Adaptive finite element processes in structural mechanics
[AD-A127010] N83-32096
Software errors and complexity: An empirical investigation N83-32358
When and how to use a software reliability model N83-32359
Software prototyping in the Software Engineering Laboratory N83-32360
The asymptotic variance of higher order crossings
[AD-A127459] N83-32430
Some generalizations of the renewal process
[AD-A127522] N83-32431
An analysis of a finite element method for convection-diffusion problems. Part 2: A posteriori error estimates and adaptivity
[AD-A128261] N83-32439
An analysis of a finite element method for convection-diffusion problems. Part 1: Quasi-optimality
[AD-A128260] N83-32440
MARYLAND UNIV. BALTIMORE COUNTY, CATONSVILLE.
User interface design of software tool system as a technology transfer vehicle N83-32362
MASCHINENFABRIK AUGSBURG-NUERNBERG A.G., MUNICH (WEST GERMANY).
Skin technology: Fundamentals and applications N83-31693
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Design technology of advanced composites
[AD-A127892] N83-31735
Advanced aluminum-lithium base alloys produced by rapid solidification from the melt
[AD-A127571] N83-31822
Ion-bombardment effects on the fatigue life of stainless steel under simulated fusion first-wall conditions
[DE83-007145] N83-31827
Prediction of pressure drop of two-phase coal slurries in pipelines
[DE83-003382] N83-32016
Health effects of combustion-generated soot and polycyclic aromatic hydrocarbons: Human cell studies
[DE83-004578] N83-32196
Dynamic scaling of manipulator trajectories
[AD-A127074] N83-32313
Computer-simulation studies of grain boundary systems and molecular solids
[AD-A127545] N83-32382
Computational introspection
[AD-A127132] N83-32399
Failure detection with uncertain models
[NASA-CR-172835] N83-32417
Binocular shading and visual surface reconstruction
[AD-A127058] N83-32580
MASSACHUSETTS UNIV., AMHERST.
Microbiological control of the aquatic weed Myriophyllum Spp
[PB83-181958] N83-32204
MATERIALS RESEARCH LABS., ASCOT VALE (AUSTRALIA).
Potassium 4-hydroxyamino-5,7-dinitro-4,5-dihydrobenzofurazanide 3-oxide, the first in a series of new primary explosives
[AD-A128557] N83-31888
MATHEMATICAL SCIENCES NORTHWEST, INC., BELLEVUE, WASH.
Research progress and forecast report for MSNW FEL oscillator program
[AD-A127786] N83-32061
MATHEMATISCH CENTRUM, AMSTERDAM (NETHERLANDS).
From A to Z: Proceedings of a Symposium in Honour of A. C. Zaanen
[MATH-CENTRE-TRACTS-149] N83-32316
Orlicz spaces: A survey of certain aspects N83-32317
Orthomorphisms N83-32318
Embeddings of Riesz subspaces with an application to mathematical statistics N83-32319
Symmetrisable operators and minimal factorization N83-32320
Orthomorphisms and the Radon-Nikodym Theorem revisited N83-32321
On the Radon-Nikodym Theorem N83-32322
Duality in the theory of Banach lattices N83-32323
Some recent results on positive groups and semi-groups N83-32324
Integral operators N83-32325
The background to Cauchy's definition of the integral N83-32326
Some lattice properties of the space L2 N83-32327
Compact operators N83-32328
MAX-PLANCK-INSTITUT FUER METALLFORSCHUNG, STUTTGART (WEST GERMANY).
Ostwald ripening and solidification behavior of near monotectic ZN-PB alloys N83-31646
MCDONNELL-DOUGLAS AUTOMATION CO., ST. LOUIS, MO.
Investigation of limit cycle response of aerodynamic surfaces with structural nonlinearities
[AD-A127140] N83-31580
MCGILL UNIV., MONTREAL (QUEBEC).
High energy electromagnetic shower position measurement by a fine grained scintillation hodoscope
[DE83-000082] N83-31951
Interaction Between Objective Analysis and Initialization. Proceedings of the 14th Stanstead Seminar
[PB83-186890] N83-32256
MEDICAL COLL. OF WISCONSIN, MILWAUKEE.
Evoked potential studies of the effects of impact acceleration on the motor nervous system
[AD-A127562] N83-32278
METROPOLITAN COLL. OF TECHNOLOGY, TOKYO (JAPAN).
Self-semilar solutions of hydrodynamic equations for expanding layer with boundary condition specified by differential equation N83-32481
METROPOLITAN COUNCIL OF THE TWIN CITIES AREA, ST. PAUL, MINN.
Preliminary evaluation of the ground-water-flow system in the Twin Cities metropolitan area, Minnesota
[PB83-174599] N83-32162
MIAMI UNIV., CORAL GABLES, FLA.
Indirect solar wind geothermal: Alternative energy sources 4, volume 4
[LC-82-71533] N83-32179
MICHIGAN UNIV., ANN ARBOR.
Electromagnetic scattering
[AD-A127899] N83-31932
Measured characteristics of multi-gap loop and asymptotic conical dipole electromagnetic field sensors
[AD-A127817] N83-31974
MIDWEST RESEARCH INST., GOLDEN, COLO.
The challenge for metrology in the R&D environment
[DE83-003101] N83-31907
MIDWEST RESEARCH INST., KANSAS CITY, MO.
Containerless high temperature property measurements by atomic fluorescence
[NASA-CR-170835] N83-32522
MINE SUBSIDENCE ENGINEERING CO., MORRISON, COLO.
Characterization of subsidence over multiple-lift longwall panels
[DE83-001856] N83-32219
MINNESOTA DEPT. OF NATURAL RESOURCES, ST. PAUL.
Preliminary evaluation of the ground-water-flow system in the Twin Cities metropolitan area, Minnesota
[PB83-174599] N83-32162

MINNESOTA UNIV., MINNEAPOLIS.
Hydrogen and sulfur from hydrogen sulfide 2: Ambient temperature electrolysis using oxidation of hydrogen sulfide by air as the prime energy source
[AD-A127488] N83-31749
Hydrogen and oxygen from water. Part 6: Quenching the effluent from a solar furnace
[AD-A127457] N83-32182
MISSION RESEARCH CORP., ALBUQUERQUE, N. MEX.
Extraction and propagation of an intense rotating electron beam
[AD-A127018] N83-32523
MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.
System analysis for the Huntsville Operational Support Center distributed computer system
[NASA-CR-170840] N83-32344
MISSOURI UNIV., COLUMBIA.
Comparison of CRD, APU, and state models for Iowa corn and soybeans and North Dakota barley and spring wheat
[E83-10379] N83-32132
MITRE CORP., BEDFORD, MASS.
Clutter processing of SEEK IGLOO: A modern long range 3-D radar
[AD-A127520] N83-31937
MITRE CORP., MCLEAN, VA.
Software description for the O'Hare runway configuration management system. Volume 2: Low-level pseudocode
[AD-A127828] N83-31592
An overview of artificial intelligence-based teaching aids
[AD-A127702] N83-32400
MITSUBISHI HEAVY-INDUSTRIES LTD., TOKYO (JAPAN).
Computer aided design and production system for sequence controllers of machine tools (MARCS)
[PB83-179135] N83-31910
MIYAZAKI UNIV. (JAPAN).
Remarks on thermal properties of rotating superfluid helium in a gravitational field N83-32502
Simulation of Brownian motion affected by Gaussian force in gravitational field N83-32503
MONSANTO RESEARCH CORP., MIAMISBURG, OHIO.
Diallyl phthalate prepolymer characterization and testing in fiberglass filled molding compounds
[DE83-009352] N83-31874
Chemistry of glass-ceramic/metal bonding for header applications. 1: Effect of treatments on Inconel 718 and Hastelloy C-276 metallic surfaces
[DE83-003367] N83-32068
MONTANA WATER RESOURCES RESEARCH CENTER, BOZEMAN.
Effects of snow compaction on water release and sediment yield, Bridger Bowl Ski Area, Gallatin County, Montana
[PB83-186445] N83-32174
MUNICIPALITY OF ANCHORAGE, ALASKA.
Integrated resource inventory for southcentral Alaska (INTRISCA)
[NASA-CR-166514] N83-32150

N

NAGOYA UNIV. (JAPAN).
Oxyhydrogen ignition and flame propagation under cryogenic temperatures N83-32484
On the interpolation formula based upon the asymptotic solution to the kinetic model equation N83-32495
Rotational temperature measurements in free jet expansions on N sub 2 using electron beam fluorescence technique N83-32496
NAPLES UNIV. (ITALY).
Influence of geometry on oscillatory Marangoni flows N83-31672
Influence of surface tension minimum on surface and buoyancy driven flows in Stokes regime N83-31673
NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, ARLINGTON, VA.
Earthquake engineering research: 1982
[PB83-176032] N83-32229
NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Seismographic networks: Problems and outlook for the 1980's
[AD-A128032] N83-32215
Earthquake Engineering Research, 1982: Overview and recommendations
[PB83-176024] N83-32228
Roles of industry and the university in computer research and development
[PB83-192039] N83-32670
NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE, WASHINGTON, D.C.
Findings and recommendations on various marine, atmospheric, and coastal zone issues
[PB83-186213] N83-32120
NATIONAL AERONAUTICAL ESTABLISHMENT, OTTAWA (ONTARIO).
Development of the MICROSAS longitudinal flight control system for the augmentor wing aircraft
[AD-A128331] N83-31608
An SEM analysis of bearing failure due to electrical arcing
[AD-A127827] N83-32071
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Contribution to the aerodynamic study of wings and propellers
[NASA-TM-77083] N83-31579
Space Transportation System Mission STS-7
[NASA-TM-85337] N83-31711
A method for making an alkaline battery electrode plate
[NASA-TM-77249] N83-31956
Energy: A continuing bibliography with indexes
[NASA-SP-7043(37)] N83-32178
Peculiarities in formation of Arabidopsis Thaliana (L.) Heynh, generative organs under space flight conditions
[NASA-TM-77263] N83-32277
NASA publications guide
[NASA-SP-7047] N83-32671
The A-stars: Problems and perspectives. Monograph series on nonthermal phenomena in stellar atmospheres
[NASA-SP-463] N83-32693
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Phosphorus-containing imide resins
[NASA-CASE-ARC-11368-1] N83-31854
Ambient and cryogenic temperature testing of a 32-channel CMOS multiplexer
[NASA-TM-84385] N83-31957
Investigation of several aspects of LANDSAT-4 data quality
[E83-10390] N83-32143
Impact of LANDSAT MSS sensor differences on change detection analysis
[E83-10395] N83-32145
Numerical Aerodynamic Simulation (NAS)
[NASA-TM-84386] N83-32397
Classical linear-control analysis applied to business-cycle dynamics and stability
[NASA-TM-84366] N83-32676
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Linear magnetic bearing
[NASA-CASE-GSC-12517-1] N83-32067
Evaluating software development by analysis of changes: The data from the software engineering laboratory
[NASA-TM-85394] N83-32353
Glossary of software engineering laboratory terms
[NASA-TM-85395] N83-32354
Recommended approach to sofware development
[NASA-TM-85396] N83-32355
Proceedings of the Seventh Annual Software Engineering Workshop
[NASA-TM-85400] N83-32356
What have we learned in the past 6 years? Measuring software development technology N83-32357
Software Engineering Laboratory (SEL). Data base organization and user's guide, revision 1
[NASA-TM-85397] N83-32369
Configuration Analysis Tool (CAT). System Description and users guide (revision 1)
[NASA-TM-85398] N83-32370
Software Engineering Laboratory (SEL) Data Base Maintenance System (DBAM) user's guide and system description
[NASA-TM-85399] N83-32371
Interferometric angle monitor
[NASA-CASE-GSC-12614-1] N83-32577
The inner edge of the plasma sheet and the diffuse aurora
[NASA-TM-85062] N83-32595
Saturn as a radio source
[NASA-TM-85023] N83-32695
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Wind-tunnel investigation of leading-edge thrust on arrow wings in supersonic flow
[NASA-TP-2167] N83-31577
Service life evaluation of rigid explosive transfer lines
[NASA-TP-2143] N83-31596
Pressure distributions obtained on a 0.04-scale and 0.02-scale model of the Space Shuttle Orbiter's forward fuselage in the Langley 20-inch Mach 6 air tunnel
[NASA-TM-84629] N83-31636
Analysis of gap heating due to stepped tiles in the shuttle thermal protection system
[NASA-TP-2209] N83-31713
Standard tests for toughened resin composites, revised edition
[NASA-RP-1092-REV] N83-31730
Vibration isolation and pressure compensation apparatus for sensitive instrumentation
[NASA-CASE-LAR-12728-1] N83-32026
Halogen Occultation Experiment (HALOE) gas cell life test program
[NASA-TM-84640] N83-32028
Solar-simulator-pumped atomic iodine laser kinetics
[NASA-TP-2182] N83-32044
Fixture for environmental exposure of structural materials under compression load
[NASA-CASE-LAR-12602-1] N83-32081
Structures and Dynamics Division: Research and technology plans for FY 1983 and accomplishments for FY 1982
[NASA-TM-85661] N83-32095
Interior noise and vibration measurements on operational military helicopters and comparisons with various ride quality criteria
[NASA-TM-84664] N83-32518
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
Control means for a gas turbine engine
[NASA-CASE-LEW-14586-1] N83-31603
Silicon-slurry/aluminide coating
[NASA-CASE-13343-2] N83-31795
Thermal barrier coating system having improved adhesion
[NASA-CASE-LEW-13901] N83-31855
Gyrotron transmitting tube
[NASA-CASE-LEW-13429-1] N83-31952
Thermionic energy converters
[NASA-CASE-LEW-12443-1] N83-32175
Advanced inorganic separators for alkaline batteries and method of making the same
[NASA-CASE-LEW-13171-2] N83-32176
High voltage v-groove solar cell
[NASA-CASE-LEW-13401-2] N83-32177
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
Materials investigation of STS-3 parachute failure
[NASA-TM-82540] N83-31712
Beam connector apparatus and assembly
[NASA-CASE-MFS-25134-1] N83-31895
Adaptive reference voltage generator for firing angle control of line-commutated inverters
[NASA-CASE-MFS-25215-1] N83-31953
Image motion compensation by area correlation and centroid tracking of solar surface features
[NASA-TM-82538] N83-32690
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.
Hydrodesulfurization of chlorinized coal
[NASA-CASE-NPO-15304-1] N83-31743
Method and apparatus for producing gas-filled hollow spheres
[NASA-CASE-NPO-14596-3] N83-31896
Cycling Joule Thomson refrigerator
[NASA-CASE-NPO-15251-1] N83-31897
Multibeam single frequency synthetic aperture radar processor for imaging separate range swaths
[NASA-CASE-NPO-14525-2] N83-31918
Synchronized voltage contrast display analysis system
[NASA-CASE-NPO-14567-1] N83-31919
Method and device for detection of a substance
[NASA-CASE-NPO-14940-1] N83-31954
System for monitoring physical characteristics of fluids
[NASA-CASE-NPO-15400-1] N83-31993
Cloud cover sensor
[NASA-CASE-NPO-14936-1] N83-32232
Distributed multiport memory architecture
[NASA-CASE-NPO-15342-1] N83-32342
Acoustic system for material transport
[NASA-CASE-NPO-15453-1] N83-32515
System for controlled acoustic rotation of objects
[NASA-CASE-NPO-15522-1] N83-32516
NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).
Includes information about the Scientific Committee NLR-NIVR, internation colaboration in the framework of AGARD, ETW and Garteur and also about the colaboration with Indonesia N83-32705

NATIONAL AEROSPACE LAB., TOKYO (JAPAN).
Computation of two-dimensional, transonic, chemically reacting nonequilibrium flow in a rocket nozzle
N83-32487
Relaxation of velocity distribution of electrons cooled (heated) by rotational excitation (de-excitation) of N sub 2
N83-32494
Monte Carlo simulation in molecular gas dynamics
N83-32500

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
Advances in the SEC (Size Exclusion Chromatography) characterization of organometallic copolymers and copolymerization: Desorption of charged species by injected dilute acetic acid
[PB83-178681] N83-31789
Structural reliability of yttria-doped, hot-pressed silicon nitride at elevated temperatures
[AD-A127583] N83-31862
Analysis of oxide and oxide/matrix interfaces in silicon nitride
[PB83-178699] N83-31883
Development of interim performance criteria for restoration coatings for porcelain enamel surfaces
[PB83-185553] N83-31884
Photoelectron spectrometer for high-resolution angular resolved studies
[DE83-008687] N83-32033
Semiautomatic AC/DC thermal voltage converter calibration system
[PB83-180224] N83-32042
Performance analysis of the Jersey City Total Energy Site
[PB83-185348] N83-32187
Self-study manual on optical radiation measurements. Part 3. Applications, chapter 1. Measurement of solar terrestrial spectral irradiance in the ozone cut-off region
[PB83-184382] N83-32231
NBS (National Bureau of Standards) and industrial biotechnology: Instrumentation and associated measurement needs
[PB83-191114] N83-32285
Taxonomy of tool features for the Ada (trade name) Programming Support Environment (APSE)
[PB83-179002] N83-32349
Basic utility graphics software for the Hewlett-Packard 9845B desktop computer
[PB83-175760] N83-32394
Cost-benefit impact study on the adoption of the draft proposed revised X3.23 American National Standard Programming Language COBOL
[PB83-191098] N83-32395
Electron and photon stimulated desorption: Benefits and pitfalls
[AD-A128239] N83-32527
Stopping powers and ranges of electrons and positrons
[PB83-175687] N83-32562

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.
Interaction Between Objective Analysis and Initialization. Proceedings of the 14th Stanstead Seminar
[PB83-186890] N83-32256
Comparison of baroclinic eddy heat transport parameterizations to a simplified general circulation model
[PB83-187849] N83-32257
Joint solar dynamics project data summary. Volume 1: Chromospheric and coronal observations
[PB83-175638] N83-32702

NATIONAL DEFENSE UNIV., WASHINGTON, D. C.
Policy and organization: The next step in the National Space Program
[AD-A127012] N83-31704

NATIONAL HURRICANE CENTER, CORAL GABLES, FLA.
Annual data and verification tabulation Atlantic tropical cyclones 1982
[PB83-184077] N83-32255

NATIONAL INST. FOR OCCUPATIONAL SAFETY AND HEALTH, CINCINNATI, OHIO.
In-depth survey report of American Airlines plating facility
[PB83-187799] N83-31916
Laser applications present and future: Prospects for significant occupational safety and health impact
[PB83-184507] N83-32066

NATIONAL INST. FOR SCIENTIFIC AND TECHNICAL CREATION, BUCHAREST (ROMANIA).
Degree of the fibers of an elliptic fibration
N83-32339

NATIONAL MARINE FISHERIES SERVICE, LA JOLLA, CALIF.
Revised update and retrieval system for the calcofi oceanographic data file
[PB83-189464] N83-32675

NATIONAL OCEAN SURVEY, ROCKVILLE, MD.
Distribution of tidal bottom stress in a New Hampshire estuary
[PB83-184085] N83-32276

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ANN ARBOR, MICH.
Great Lakes precipitation by months, 1900-80
[PB83-175737] N83-32250

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, HONOLULU, HAWAII.
Annotated Tsunami bibliography: 1962-1976
[DE83-900003] N83-32270

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.
The GOES user's guide
N83-31710

NATIONAL PHYSICAL LAB., TEDDINGTON (ENGLAND).
A theoretical model for the Speech Input Device SID3. Part 1: Filters
[NPL-DITC-20/83-PT-1] N83-31921
A theoretical model for the Speech Input Device SMD3. Part 2: Correlators
[NPL-DITC-21/83-PT-2] N83-31922
A hardware preprocessor for use in speech recognition: Speech Input Device SID3
[NPL-DITC-22/83] N83-31923
Electromagnetic Stirred Mode Cavities (SMCs)
[NPL-DES-75] N83-31955
Non-linear data fitting for analysis of friction stress and recovery in metal alloys
[NPL-DITC-13/82] N83-32093
Recommended procedure for micro-indentation Vickers hardness test
[NPL-MOM-62] N83-32094
The algebraic Riccati equation: A summary review of some available results
[NPL-DITC-23/83] N83-32405
Suitability of a wall-stabilized arc as a transfer standard of spectral radiance in the spectral range 165 to 350 nm
[NPL-QU-65] N83-32479
The effect on the measurement of aircraft noise of reflections from the ground
[NPL-AC-102] N83-32517

NATIONAL RESEARCH INST. FOR POLLUTION AND RESOURCES, TOKYO (JAPAN).
Heat transfer rate of looped type heat pipes using water and Nak as working fluid under liquid phase flow
N83-32508

NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VA.
Bibliography of appropiate technology information for developing countries: Selected abstracts from the NTIS data file (Fourth Edition)
[PB83-113852] N83-32669

NATIONAL WEATHER SERVICE, ANCHORAGE, ALASKA.
Daily flow statistics of Alaskan streams
[PB83-180133] N83-32166

NATIONAL WEATHER SERVICE, KANSAS CITY, MO.
Regional weather depiction plot
[PB83-194415] N83-32258

NAVAL AEROSPACE MEDICAL INST., PENSACOLA, FLA.
The thermal basis for disruption of operant behavior by microwaves in three animal species
[AD-A127370] N83-32279
Two experiments on laboratory-induced motion sickness. Part 1: Acupressure. Part 2: Repeated exposure
[AD-A127327] N83-32290

NAVAL AEROSPACE MEDICAL RESEARCH LAB., PENSACOLA, FLA.
Operant behavior and colonic temperature of rhesus monkeys, Macaca mulatta, exposed to microwaves at frequencies above and near whole-body resonance
[AD-A127326] N83-32280
Preliminary evaluation of two dichotic listening tasks as predictors of performance in naval aviation undergraduate pilot training
[AD-A127337] N83-32304

NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA.
Multifunction spread spectrum technology
[AD-A127045] N83-31929
Impulse response of the ocean floor nonlinear techniques for measurement enhancement
[AD-A128578] N83-32269

NAVAL BIODYNAMICS LAB., NEW ORLEANS, LA.
Evoked potential studies of the effects of impact acceleration on the motor nervous system
[AD-A127562] N83-32278

NAVAL HEALTH RESEARCH CENTER, SAN DIEGO, CALIF.
Psychopharmacological techniques for optimizing human performances
[AD-A128529] N83-32309

NAVAL OCEAN RESEARCH AND DEVELOPMENT ACTIVITY, BAY ST. LOUIS, MISS.
Optical character recognition for automated cartography: The advanced development handprinted symbol recognition system
[AD-A127566] N83-32152
Global analysis of the shallow geology of large-scale ocean slopes
[AD-A128208] N83-32267
K-band radiometric mapping of sea ice
[AD-A128205] N83-32268

NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.
BAYR, a data association algorithm based on a Bayesian recursion
[AD-A127460] N83-32468

NAVAL OCEANOGRAPHY COMMAND CENTER/JOINT TYPHOON WARNING CENTER, FPO SAN FRANCISCO, CALIF.
Predicting the acceleration of northward-moving tropical cyclones using upper-tropospheric winds
[AD-A127446] N83-32235

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Expansion of the scan endgame program for aircraft survivability studies and development of a supporting user's guide
[AD-A127557] N83-31598
Computer program analysis of helicopter weight estimate relationships utilizing parametric equations
[AD-A128590] N83-31600
Monochromatic high-speed photography of solid rocket propellant combustion
[AD-A127874] N83-31747
Preliminary investigation of aluminum combustion in air and steam
[AD-A128566] N83-31757
Decision models for conducting an economic analysis of alternative fuels for the ice engine
[AD-A127954] N83-31887
Coherence studies of geomagnetic fluctuations in the frequency range .05 to 10 Hz
[AD-A127708] N83-31936
Naval communications processing and routing system (NAVCOMPARS): A model for broadcast performance analysis
[AD-A127990] N83-31940
Some effects of stress on users of a voice recognition system: A preliminary inquiry
[AD-A128559] N83-31944
A preliminary analysis of human factors affecting the recognition accuracy of a discrete word recognizer for C3 systems
[AD-A128546] N83-31946
A time slot assignment algorithm for a TDMA packet radio network
[AD-A128545] N83-31947
An effect of turbulent diffusion on the glow discharge-to-arc transition
[AD-A128553] N83-32009
Holographic investigation of solid propellant combustion particulates
[AD-A127841] N83-32029
Thermal coupling and damage mechanims of 1.06 micron laser radiation and laser-produced plasma on selected materials
[AD-A127608] N83-32045
Analysis of laser-turbulence utilizing a video tape recorder and digital storage oscilloscope
[AD-A127859] N83-32049
Optimum design of stiffened plates using the finite element method
[AD-A128556] N83-32110
Methods of hydrographic surveying used by different countries
[AD-A128576] N83-32154
Tactical application of an atmospheric mixed-layer model
[AD-A127527] N83-32212
Workshop for the Winter Monsoon Experiment
[AD-A127989] N83-32239
Further studies in the application of dynamic initialization for global prediction models with special attention to equatorial waves
[AD-A128511] N83-32241
Ocean floor geomagnetic data collection system
[AD-A127618] N83-32260
Integration analysis: A proposed integration of test and evaluation techniques for early on detection of human factors engineering discrepancies
[AD-A127611] N83-32314
Universal microcomputer interface for data acquisition
[AD-A127875] N83-32346

Hardware and software implementation of an interface between the Unibus and the General Purpose Interface Bus
[AD-A127564] N83-32377
A survey of software quality assurance methods and an evaluation of software quality assurance at Fleet Material Support Office
[AD-A127676] N83-32378
An approach for implementing a microcomputer based report origination system in the Ada programming language
[AD-A128028] N83-32383
Stationary exponential time series: Further model development and a residual analysis
[AD-A128347] N83-32437
A random tour process of known length between known end points
[AD-A128243] N83-32441
Two models of time constrainted target travel between two endpoints constructed by the application of Brownian motion and a random tour
[AD-A127805] N83-32448
Women at sea: Welcome aboard
[AD-A128602] N83-32646
Problems associated with the implementation of management control systems
[AD-A127254] N83-32658
Organizational structure considerations for software development projects
[AD-A127061] N83-32660
A summary of the foundation research program, FY 1982
[AD-A127995] N83-32663

NAVAL RESEARCH LAB., WASHINGTON, D. C.
CB agent threat to atmosphere inside Navy aircraft
[AD-A127882] N83-31587
Actuator-placement considerations for the control of large space structures
[AD-A128241] N83-31720
On fatigue crack growth in a Ti-4, 5Al-5Mo-1.5Cr alloy with metastable beta-phase
[AD-A128048] N83-31825
Wideband HF channel prober: System description
[AD-A127040] N83-31924
Controlled test procedures for using intervocalic consonauts to assess speech intelligibility: A feasibility study
[AD-A127953] N83-31941
Contact-potential and surface-charge effects in atmospheric-electrical instrumentation
[NASA-CR-172834] N83-32027
Use of induced spatial incoherence for uniform illumination on laser fusion targets
[AD-A127612] N83-32050
Laser-plasma interaction experiments and diagnostics at NRL (Naval Research Laboratory)
[AD-A128254] N83-32060
Cylindrical Bessel functions for a large range of complex arguments
[AD-A128049] N83-32428
Three-dimensional parabolic-equation-based estimation of the ocean acoustic field
[AD-A128507] N83-32520
Drag instability in the modified betatron
[AD-A128242] N83-32526
Generation of enhanced-scalelength plasmas and Zeeman study of magnetic fields
[AD-A127951] N83-32596
A quantitative study of magnetic flux transport on the Sun
[AD-A127122] N83-32697
Cosmic ray effects on microelectronics. Part 2: The geomagnetic cutoff effects
[AD-A128601] N83-32703

NAVAL SUBMARINE MEDICAL RESEARCH LAB., GROTON, CONN.
Cold weather goggles. Part 5: Acceptable limits of optical distortion
[AD-A127657] N83-32315

NAVAL SURFACE WEAPONS CENTER, DAHLGREN, VA.
On computing instantaneous geocentric tides along satellite tracks, the NSWC STT program
[AD-A128568] N83-32264

NAVAL TRAINING ANALYSIS AND EVALUATION GROUP, ORLANDO, FLA.
The application of distributed system architectures for computer-based instructional systems in the Naval Education and Training Command
[AD-A127694] N83-32347

NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.
ELF PVS field strength measurements, October 1977
[AD-A128196] N83-31930
ELF (Extremely Low Frequency) PVS (Propagation Validation System) field strength measurements, January 1977
[AD-A128265] N83-31942
Solution of systems of complex linear equations in the L infinity norm with constraints on the unknowns
[AD-A127883] N83-32410
Optimum multisensor, multitarget time delay estimation
[AD-A127839] N83-32423

NEVADA UNIV., RENO.
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A127765] N83-31755

NEW HAMPSHIRE UNIV., DURHAM.
Distribution of tidal bottom stress in a New Hampshire estuary
[PB83-184085] N83-32276

NEW MEXICO UNIV., ALBUQUERQUE.
Application of a third-invariant plasticity theory to concrete and soils
[AD-A127079] N83-32097

NIELS BOHR INST., COPENHAGEN (DENMARK).
Charge correlations in deep inelastic proton-proton interactions at the CERN ISR: The axial field spectrometer collaboration
[DE83-002324] N83-32539

NIELSEN ENGINEERING AND RESEARCH, INC., MOUNTAIN VIEW, CALIF.
Tests of subgrid-scale models in strained turbulence. Studies of the structure of homogeneous shear flows: Developing a model of turbulence near a wall from solutions of the Navier-Stokes equation
[AD-A128262] N83-32004

NIHON UNIV., TOKYO (JAPAN).
Frequency effect of transonic flow over an oscillating airfoil N83-32486

NIPPON KOKAN CO. LTD., TOKYO (JAPAN).
Development of heavy section 3.5% Ni steel plates with good mechanical properties after stress relieving
[PB83-178665] N83-31850
Research on hot cracking in weld metal by melting-solidification heat cycle simulator
[PB83-178921] N83-32075

NIPPON STEEL CORP., TOKYO (JAPAN).
Development of narrow gap welding technology for extremely thick steel
[PB83-178913] N83-31909

NORGES TEKNISKE HOEGSKOLE, TRONDHEIM.
Review of factors affecting microstructure and toughness in simulated heat-affected zones of structural steels
[PB83-180208] N83-31851

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIV., GREENSBORO.
Distribution of functionality and levels of functionality as a solution to the CONOPS problem
[AD-A127651] N83-32379

NORTH CAROLINA STATE UNIV., RALEIGH.
Studies in air quality meteorology at North Carolina State University
[PB83-181743] N83-32252

NORTH CAROLINA UNIV., CHAPEL HILL.
Limit laws for the maximum of weighted and shifted I.I.D. random variables
[AD-A128359] N83-32438
On a problem concerning spacings
[AD-A128509] N83-32449
Algorithms and heuristics for variable-yield lot-sizing
[AD-A127559] N83-32478

NORTH DAKOTA WATER RESOURCES RESEARCH INST., FARGO.
Mechanisms, distribution and frequency of groundwater recharge in upland areas of western North Dakota
[PB83-182121] N83-32168

NORTHWESTERN UNIV., EVANSTON, ILL.
Electronically induced phase transformations
[AD-A127031] N83-31745
Statistical mechanics of non-equilibrium processes in plasmas and gases
[AD-A128339] N83-32006

NOTRE DAME UNIV., IND.
Aerodynamics of airfoils subject to three-dimensional periodic gusts
[AD-A127043] N83-31581
Tension cutoff and parameter identification for the viscoplastic cap model
[AD-A128304] N83-32217

O

OAK RIDGE NATIONAL LAB., TENN.
Extractive distillation of nitric acid using the two-pot concept
[DE83-004176] N83-31777
Rapid solidification studies of Ni3Al alloys
[DE83-004648] N83-31838
Technical considerations in choosing alcohol fuels for less-developed countries
[DE83-004644] N83-31891
Low-pressure transfer operations
[DE83-003443] N83-32011
The applicability of earth coupled heat pumps and factors affecting their performance
[DE83-004816] N83-32021
Study of heat and mass transfer in a vertical-tube evaporative cooler
[DE83-003480] N83-32022
Oak Ridge beam-analysis system
[DE83002587] N83-32035
Applications of energy-release-rate techniques to part-through cracks in experimental pressure vessels
[DE83-003486] N83-32112
Cloud water: An important vector of atmospheric deposition
[DE83-004646] N83-32244
Influence of scanning variables on ultrasonic response
[DE83-003754] N83-32521
Atomic physics processes in radial transport calculations
[DE83-007172] N83-32535
Third-harmonic generation for photoionization studies
[DE83-001960] N83-32544
Constrained ripple optimization of Tokamak bundle divertors
[DE83-006363] N83-32587
Plasma-edge studies in ISX-B and EBT-S using surface probes and laser-induced fluorescence
[DE83-821045] N83-32601
Multiprogram Laboratory Panel Energy Research Advisory Board. Volume 2: Support studies
[DE83-002694] N83-32668

OAK RIDGE Y-12 PLANT, TENN.
Technical considerations in choosing alcohol fuels for less-developed countries
[DE83-004644] N83-31891
Improving divider calibration techniques
[DE83-004061] N83-31988

OCHANOMIZU WOMEN'S UNIV., TOKYO (JAPAN).
Lift generation due to vortex shedding N83-32488

OFFICE OF NAVAL RESEARCH, ARLINGTON, VA.
Stopping powers and ranges of electrons and positrons
[PB83-175687] N83-32562

OFFICE OF NAVAL RESEARCH, LONDON (ENGLAND).
NATO/London Mathematical Society Advanced Study Institute on systems of Nonlinear Partial Differential Equations
[AD-A126996] N83-32406
European Scientific Notes, volume 37, number 1
[AD-A126961] N83-32672

OHIO STATE UNIV., COLUMBUS.
Analysis of gas purification by heatless adsorption
[DE83-003965] N83-31783
Near field analysis of airborne antenna
[AD-A127246] N83-31931
Neutrino mixing in grand unified models
[DE83-004342] N83-32552
The development and evaluation of point defect models for the growth of passive films on single crystal, polycrystalline, and amorphous metal surfaces
[AD-A128333] N83-32619

OKLAHOMA STATE UNIV., STILLWATER.
Biochemical analyses for detection and assessment of pollution in the subsurface environment
[PB83-182303] N83-31793

OLD DOMINION UNIV., NORFOLK, VA.
Thermal-structural analysis of large space structures: A review of recent advances
[AD-A128016] N83-32107

OPTICAL SOCIETY OF AMERICA, WASHINGTON, D. C.
Topical Meeting on Laser Techniques for Extreme Ultraviolet Spectroscopy
[AD-A127044] N83-32048

OREGON STATE UNIV., CORVALLIS.
An economic analysis of alternative paving materials
[AD-A127534] N83-31903
Variability of precipitation in the Pacific Northwest: Spatial and temporal characteristics
[PB83-175232] N83-32249

OSAKA PERFECTURE (JAPAN).
Unstable phenomena in a two-phase closed thermosyphon N83-32506

OXFORD UNIV. (ENGLAND).
The TOPSY guide. Transient tunnel operating, data acquisition and processing system. User's and programmer's guides
[OUEL-1462/83] N83-31610
Robustness with simultaneous pole and zero movement across the j-omega axis
[OUEL-1465/83] N83-32404

Behaviour of a 6 m high thermosiphon
[OUEL-1460/83] N83-32514
Determination of the angular and energy dependence of hard constituent scattering from pi-O pair events at the CERN intersecting storage rings
[DE83-002451] N83-32538

P

PACIFIC NORTHWEST LAB., RICHLAND, WASH.
Solubilities of actinide solids under oxic conditions
[DE83-002675] N83-31776
Use of analytical electron microscopy and Auger electron spectroscopy for evaluating materials
[DE83-003658] N83-31784
Influence of composition and substrate bias on structure and inert-gas content of sputter-deposited Ni-La alloys
[DE83-002716] N83-31830
Effects of microstructure on light ion irradiation creep in nickel
[DE83-003467] N83-31831
WATEQ3 geochemical model: Thermodynamic data for several additional solids
[DE83-000896] N83-32155
Review of ground-water flow and transport models in the unsaturated zone
[DE83-004256] N83-32158
Review and evaluation of paleohydrologic methodologies
[DE83-004572] N83-32159
Critical considerations in the assessment of health and environmental risks: What we have learned from the nuclear experience
[DE83-005292] N83-32194
Interpretations of the OSCAR data for reactive-gas scavenging
[DE83-003597] N83-32195
Beta and low-energy photon irradiation of several commercial phosphors
[DE83-006606] N83-32531
Response of a multi-element dosimeter to calibrated beta sources with E sub max from 0.23 to 3.5 MeV
[DE83-002013] N83-32532
Relevance of biotic pathways to the long-term regulation of nuclear-waste disposal. Topical Report on reference western arid low-level sites
[DE83-002575] N83-32576
PARIS-SUD UNIV., ORSAY (FRANCE).
Systems of difference-differential equations N83-32334
PASTEUR (LOUIS) UNIV., STRASBOURG (WEST GERMANY).
Fiber cobordism and approximation of a singular submanifold by C(infinity) N83-32340
PATTERN ANALYSIS AND RECOGNITION CORP., NEW HARTFORD, N.Y.
Modern signature analysis
[AD-A127993] N83-31939
PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Investigation of axisymmetric buoyant turbulent diffusion flames: Turbulence properties and concentrations of major species
[PB83-175612] N83-31915
An analysis of conical indentation of an elastic/perfectly plastic half-space by nonlinear finite element techniques
[AD-A127529] N83-32104
Computer analysis for dynamic response of beams and plates on elastic foundations
[AD-A127504] N83-32105
A light-scattering system to measure cavitation nuclei: Analysis and calibration
[AD-A127946] N83-32589
PENNSYLVANIA UNIV., PHILADELPHIA.
Charge correlations in deep inelastic proton-proton interactions at the CERN ISR: The axial field spectrometer collaboration
[DE83-002324] N83-32539
PERKINS AND WILL, INC., WASHINGTON, D.C.
Energy conservation for housing: A workbook
[PB83-185330] N83-32186
PHILIPS ZENTRALLABORATORIUM G.M.B.H., HAMBURG (WEST GERMANY).
Influence of ion radiation on the magnetic properties of ferrimagnetic films
[BMFT-FB-T-83-048] N83-32644
PISA UNIV. (ITALY).
The theorem of semi-proper complexification N83-32332
PITTSBURGH UNIV., PA.
Characterization of internal sales by laser desorption mass spectrometry
[AD-A127916] N83-31746
High-temperature corrosion of ceramics
[DE83-006763] N83-31873
Comparison of algorithms for computing generating-system reliability indexes
[DE83-901863] N83-32079
Adaptive finite element processes in structural mechanics
[AD-A127010] N83-32096
Inference on parameters in a linear model, a review of recent results
[AD-A127486] N83-32429
POLITECNICO DI MILANO (ITALY).
An analysis of the driving forces in liquid phase sintering N83-31691
Adhesion of metals experiment simulation and ground-based reference test results N83-31692
POLYTECHNIC INST. OF NEW YORK, BROOKLYN.
Transverse and quantum effects in superfluorescence: Pump dynamics for three-level superfluorescence; An algorithm for transverse, full transient effects in optical bistability in a Fabry-Perot cavity
[AD-A127502] N83-32584
POLYTECHNICAL UNIV. OF MADRID (SPAIN).
Fluid physics under reduced gravity: An overview N83-31638
POWER TECHNOLOGIES, INC., SCHENECTADY, N. Y.
Development of a leak location system for use on underground electric power transmission cable
[DE83-900533] N83-31983
PRINCETON UNIV., N. J.
Studies of experiments on droplet burning at reduced gravity N83-31667
Diffusion of hydrogen and deuterium in Zr-Al
[DE83-002214] N83-31829
Effect of the extent of cure on the modulus, glass transition, water absorption, and density of an amine-cure epoxy
[AD-A127090] N83-31859
Least absolute deviations regression
[DE83-004424] N83-32456
Continuous Tokamak operation with an internal transformer
[DE83-002340] N83-32600
Diagnostics for neutral-beam-heated Tokamaks
[DE83-005049] N83-32605
PURDUE UNIV., LAFAYETTE, IND.
Supercooled water
[AD-A127539] N83-31753
Fault diagnosis of nonlinear analog circuits, volume 5. HAFDIC: A program for generating a hard fault dictionary
[AD-A127021] N83-31958
Fault diagnosis of nonlinear analog circuits. Volume 4: An isolation algorithm for the analog fault dictionary
[AD-A127020] N83-31959
Fault diagnosis of nonlinear analog circuits. Volume 3: Fault diagnosis in the tableau context
[AD-A127019] N83-31960
Analysis of steady, 2-dimensional chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique. Volume 1: Theoretical development
[AD-A127219] N83-31997
Wall layer structure and drag reduction: Bursting rates
[AD-A128004] N83-32003
Heat transfer to water from a vertical tube bundle under natural-circulation conditions
[DE83-008459] N83-32010
Statistical analysis of the daily streamflow hydrograph and a probability distribution of the interarrival times of peak flows-application to Indiana
[PB83-187153] N83-32171
Synthetic seismogram modeling
[AD-A128305] N83-32218
Effects of standard extremity on mixed standard scale performance ratings
[AD-A128645] N83-32310
Methodological contributions of person perception to performance appraisal
[AD-A128638] N83-32311
On subset selection procedures for the largest mean from normal populations having a common known coefficient of variation
[AD-A127136] N83-32461

R

RANGE COMMANDERS COUNCIL, WHITE SANDS MISSILE RANGE, N. MEX.
Flight termination system equipment. Volume 4: Safing and arming devices, initiators, and shaped charges
[AD-A127480] N83-31707
Flight termination system equipment. Volume 3: Relays, timers, and switches
[AD-A127479] N83-31708
RAYCHEM CORP., MENLO PARK, CALIF.
Combat maintenance concepts and repair techniques using shape memory alloys for fluid lines, control tubes and drive shafts
[AD-A127826] N83-31572
RAYTHEON CO., WALTHAM, MASS.
Design study for a gound microwave power transmission system for use with a high-altitude powered platform
[NASA-CR-168344] N83-32180
RCA LABS., PRINCETON, N. J.
Optimized couplers between junction lasers and single-mode fibers
[AD-A128040] N83-32056
REIFER CONSULTANTS, INC., TORRANCE, CALIF.
Error taxonomy: What can be gained? N83-32366
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
Electroplating of refractory metals and alloys from fluoride melt
[AD-A127116] N83-31819
Digital communications in spatially distributed interference channels
[AD-A127741] N83-31943
Stress analysis for anisotropic hardening in finite-deformation plasticity
[AD-A127063] N83-32098
RENSSELAER RESEARCH CORP., TROY, N. Y.
Convection effects at solid-liquid interfaces: Influence of gravity N83-31686
RHODE ISLAND UNIV., KINGSTON.
Gordon Research Conference in Organometer Chemistry
[AD-A127055] N83-31725
Fast Kalman filtering for ARMA (autoregressive moving average) processes: Fixed point implementation
[AD-A126994] N83-32407
ROCHESTER INST. OF TECH., N. Y.
Comparison of modelled and empirical atmospheric propagation data
[E83-10398] N83-32146
ROCHESTER UNIV., N. Y.
Theory of collision-induced ionization of adsorbed species on solid surfaces in the presence of laser radiation
[AD-A128317] N83-32059
Evaluation of the total time in system in a preempt/resume priority quene via a modified Lindley process
[AD-A127814] N83-32403
Significance points for some tests of uniformity on the sphere, revision
[AD-A128027] N83-32435
A decomposition of the Beta distribution, related order and asymptotic behavior
[AD-A127815] N83-32474
Inclusion of discrete-to-continuum coupling in multiphoton excitation and dissociation calculations
[NASA-CR-172836] N83-32529
Dynamical phenomena in sunspots
[AD-A126931] N83-32698
ROCKEFELLER UNIV., NEW YORK.
Determination of the angular and energy dependence of hard constituent scattering from pi-O pair events at the CERN intersecting storage rings
[DE83-002451] N83-32538
ROCKWELL INTERNATIONAL CORP., CANOGA PARK, CALIF.
High speed cryogenic self-acting, shaft seals for liquid rocket turbopumps
[NASA-CR-168194] N83-32070
ROCKWELL INTERNATIONAL CORP., GOLDEN, COLO.
Ferrite catalyst
[DE83-0006514] N83-31762
Catalyst for exhaust-gas purification
[DE83-005019] N83-31770
Ferromagnetic porous plastics
[DE83-008679] N83-31875
Fireproof ceramics and process for their manufacture
[DE83-005021] N83-31881
Near-surface meteorological conditions associated with active resuspension of dust by wind erosion
[DE83-006272] N83-32247
ROCKWELL INTERNATIONAL CORP., RICHLAND, WASH.
Geophysical investigation of eastern Yakima Ridge, south-central Washington
[DE83-002618] N83-32225
ROCKWELL INTERNATIONAL CORP., THOUSAND OAKS, CALIF.
LDEF experiments: Crystal growth by a solute diffusion process N83-31664
The CAD/CAM handbook for polymer composite reliability, volume 2
[AD-A127721] N83-31864
CAD/CAM handbook for polymer composite reliability, volume 1
[AD-A127720] N83-31865

ROME AIR DEVELOPMENT CENTER, GRIFFISS AFB, N.Y.
Backscattering from anisotropic random media
[AD-A127873] N83-31933
Surface acoustic wave non-linear interactions in lithium niobate
[AD-A127570] N83-32052
Notes on the conversion of logLisp from Rutgers/UCI-Lisp to interLisp
[AD-A127718] N83-32380
ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH (ENGLAND).
The problems of protection against optical radiation
[BR88714] N83-32287
ROYAL INST. OF TECH., STOCKHOLM (SWEDEN).
Precipitation of gas pores in metallic metals during cooling under microgravity N83-31648
The effect of the natural convection on the solidification of metallic alloys N83-31687
Soldering under microgravity N83-31690
ROYAL NORWEGIAN COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, OSLO.
Space research in Norway
[SAD-102-T] N83-32689
ROYAL OBSERVATORY, EDINBURGH (SCOTLAND).
Activities in astronomy
[ISBN-0-902553-23-2] N83-32692
RUHR UNIV., BOCHUM (WEST GERMANY).
Adsorption behavior of pure fluids near the gas-liquid critical point N83-31697
RUTGERS - THE STATE UNIV., NEW BRUNSWICK, N. J.
The effect of plasticizer on the piezoelectric properties of unoriented polyvinylidene fluoride films
[AD-A127863] N83-31861
Theoretical investigation of three-dimensional shock wave-turbulent boundary layer interactions
[AD-A127118] N83-31999

S

SAN DIEGO STATE UNIV., CALIF.
Research needed to determine the present carbon balance of northern ecosystems and the potential effect of carbon dioxide induced climate change
[DOE/EV-10019/14-VOL-2-PT-14] N83-32189
SAN JOSE STATE UNIV., CALIF.
Synthesis, characterization and polymerization of fluorocarbon ether elastomers
[NASA-CR-166487] N83-31723
The effects of CO and HCN on pole-jump avoidance-escape behavior
[NASA-CR-166512] N83-32301
Risk estimates for CO exposure in man based on behavioral and physiological responses in rodents
[NASA-CR-166513] N83-32302
SANDIA LABS., ALBUQUERQUE, N. MEX.
Wellborne inertial navigation system
[DE83-004012] N83-31593
Tonopah Test Range capabilities: Technical manual
[DE83-005362] N83-31709
Densification kinetics of shock-activated nitrides
[DE83-003008] N83-31742
Hydrogen combustion results from the Sandia intermediate-scale (VGES) tank and the Sandia critical-tube-diameter test facility
[DE83-018744] N83-31761
Turbulent combustion rate in a spark ignition engine: Some comparisons between model predictions and experiments
[DE83-003205] N83-31767
Hydrogen combustion in aqueous foams
[DE83-002534] N83-31775
IBEX foilles diode experiments
[DE83-009185] N83-31976
GaP/Al-x/Ga-1-x/P heterojunction bipolar junction transistor for high-temperature electronic applications
[DE83-001267] N83-31977
Equipment qualification research test of electrical cable with factor splices and insulation rework: Test no. 2, report no. 1
[DE83-002165] N83-31980
Heat-transfer characteristics of dry porous particulate beds with internal heat generation N83-32012
Geotechnical instrumentation requirements for at-depth testing and repository monitoring in tuff
[DE83-002188] N83-32034
Weld-cracking mechanisms in austenitic stainless steels
[DE83-001157] N83-32111
X-ray measurements of water-fog density
[DE83-005139] N83-32243
Algebraic approximation of event tree sequences
[DE82-022169] N83-32452
Extraction and propagation of an intense rotating electron beam
[AD-A127018] N83-32523
Transition radiation: A possible diagnostic tool for relativistic electrons at Sandia
[DE83-006844] N83-32533
Quality assurance program for isotopic power systems
[DE83-005250] N83-32560
Corrosion resistant canisters for nuclear waste isolation
[DE83-000090] N83-32564
Nuclear-waste disposal: Technical issues and status
[DE83-002185] N83-32568
Systems overview of the subseabed disposal program
[DE83-000091] N83-32569
Localization of surface excitations and stimulated desorption
[DE83-002143] N83-32625
Fundamental models of electronic transport in amorphous semiconductors
[DE83-000313] N83-32626
Ga(As,P) strained-layer super-lattices: A ternary semiconductor with independently adjustable band gap and lattice constant
[DE83-003917] N83-32634
Doping and transport studies in In/sub x/Ga/sub 1-x/As/GaAs strained-layer superlattices
[DE83-003915] N83-32640
Simple theory for maximum H inventory and release: A new transport parameter
[DE82-014076] N83-32641
SCHOOL OF AEROSPACE MEDICINE, BROOKS AFB, TEX.
Detecting monomethylhydrazine rocket fuel vapors with the MDA model 3060 autospot automatic toxic gas detector
[AD-A127512] N83-31722
Retrograde amnesia, in rats, produced by electron beam exposure
[AD-A126870] N83-32282
SCIENCE APPLICATIONS, INC., MCLEAN, VA.
Energy release and fluid dynamics in multiphase systems
[AD-A128289] N83-32005
SCIENCE APPLICATIONS, INC., MONTEREY, CALIF.
Tropical cyclone wind probability forecasting for the north Indian Ocean (WINDPIO)
[AD-A127130] N83-32233
SCIENCE APPLICATIONS, INC., ORLANDO, FLA.
User's manual for training device cost model 'TRACOM'
[AD-A128355] N83-32664
User's manual for Cost Proposal Evaluation Program (CPEP)
[AD-A128356] N83-32665
SCIENCE RESEARCH COUNCIL, CHILTON (ENGLAND).
Charge correlations in deep inelastic proton-proton interactions at the CERN ISR: The axial field spectrometer collaboration
[DE83-002324] N83-32539
SEIKEI UNIV., TOKYO (JAPAN).
Studies on condensation heat transfer in two-phase closed thermosyphons N83-32505
SEVILLE RESEARCH CORP., PENSACOLA, FLA.
Private pilot flight skill retention 8, 16 and 24 months following certification
[DOT/FAA/CT-83/34] N83-32303
SHEFFIELD UNIV. (ENGLAND).
Plant step data and gain estimates in the robust feedback tuning regulator problem
[RR-211] N83-31991
A new algorithm for the solution of optimal control commutative bilinear system
[RR-212] N83-32393
Robust sampled regulators for stable systems from plant step data
[RR-213] N83-32459
Simple model order reduction by truncation with performance verification by fast digital simulation
[RR-217] N83-32460
SHOCK AND VIBRATION INFORMATION CENTER (DEFENSE), WASHINGTON, D. C.
The Shock and Vibration Digest, volume 15, no. 4
[AD-A128158] N83-32082
The Shock and Vibration Digest, volume 15, no. 3
[AD-A126991] N83-32089
SIMPSON GUMPERTZ AND HEGER, INC., CAMBRIDGE, MASS.
Structural plastics design manual. Volume 2: Phases 2 and 3, chapters 5 - 10
[PB83-185595] N83-31885
SIMULA, INC., TEMPE, ARIZ.
Design and test criteria for increased energy-absorbing seat effectiveness
[AD-A128015] N83-31589
SIRA INST. LTD., CHISLEHURST (ENGLAND).
Three laser scanning instruments for automatic surface inspection N83-32578
SMITH-KETTLEWELL INST. OF VISUAL SCIENCES, SAN FRANCISCO, CALIF.
Velocity discrimination in the peripheral visual field
[AD-A127949] N83-32297
SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASS.
Empirical modeling of the geomagnetic variation in the thermosphere
[AD-A127007] N83-32207
SOFTWARE OPTIONS, INC., CAMBRIDGE, MASS.
The development of a programming support system for rapid prototyping
[AD-A128251] N83-32386
SOUTHWESTERN UNIV., GEORGETOWN, TEX.
Preliminary design of an Earth-based debris detection system using current technology and existing installations
[NASA-CR-171680] N83-31705
SPECTRA-PHYSICS, INC., MOUNTAIN VIEW, CALIF.
High efficiency picosecond pulse generation in the 675-930 NM region from a dye laser synchronously pumped by an argon-ion laser
[AD-A128033] N83-32058
SPERRY UNIVAC, BLUE BELL, PA.
Software error data collection and categorization N83-32364
SRI INTERNATIONAL CORP., MENLO PARK, CALIF.
Southwest PAVE PAWS radar system: Environmental assessment
[AD-A128554] N83-31945
Dynamic fracture behavior of structural materials
[AD-A127902] N83-32101
Aurora-region dynamics determined with the Chatanika radar
[AD-A127042] N83-32208
The MITHRAS: A program of simultaneous radar observations of the high-latitude auroral zone
[AD-A127016] N83-32220
Bioeffects of radiofrequency radiation: A review pertinent to Air Force operations
[AD-A128515] N83-32293
Identification and cleavage of breakable single bonds by selecting oxidation, reduction and hydrolysis
[DE83-005312] N83-32624
STAHLWERKE PEINE-SALZGITTER A.G. (WEST GERMANY).
Use of sleeved rolls in a blooming mill
[BMFT-FB-T-83-042] N83-31908
STANFORD LINEAR ACCELERATOR CENTER, CALIF.
High energy electromagnetic shower position measurement by a fine grained scintillation hodoscope
[DE83-000082] N83-31951
Versatile secondary trigger for a multi-detector system
[DE83-04414] N83-31982
Use of nitrogen laser for observation of space-charge effects in drift chambers
[DE83-004416] N83-32065
Testing quantum chromodynamics
[DE83-004391] N83-32555
STANFORD RESEARCH INST., CALIF.
Experiences and perspectives with SRI's tools for software design and validation N83-32361
STANFORD UNIV., CALIF.
Flight directors for STOI aircraft
[NASA-CR-166517] N83-31590
Research in VLSI systems. Heuristic programming project and VLSI theory project: A fast turn around facility for Very Large Scale Integration (VLSI)
[AD-A127153] N83-31961
A deductive approach to the debugging, verification and modification of programs
[AD-A127900] N83-32373
A statistical approach to zonal polynominals
[AD-A127624] N83-32418
Aggregates, activities and overheads
[AD-A127830] N83-32477
Research studies on radiative collisional processes
[AD-A128533] N83-32509
Research in space commercialization, technology transfer, and communications, volume 2
[NASA-CR-172955] N83-32657
Comparison of heliospheric current sheet structure obtained from potential magnetic field computations and from observed polarization coronal brightness
[NASA-CR-172832] N83-32700
STATE UNIV. OF NEW YORK, BUFFALO.
Enhancing perceptibility of barely perceptible targets
[AD-A127569] N83-32582
STATE UNIV. OF NEW YORK, STONY BROOK.
X-ray topographic fractography of single crystals of molybdenum and niobium
[DE83-005066] N83-32642

STRATEGIC DECISIONS GROUP, MENLO PARK, CALIF.
Generating capacity in US electric utilities: How is it used? How much is needed over the decade
[DE83-900733] N83-31990
STUTTGART UNIV. (WEST GERMANY).
Recent advances in Thomson scattering: High repetition rate Thomson scattering diagnostics on large plasma devices
[IPF-82-15] N83-32610
Proposal for a new Thomson scattering technique for large fusion devices
[IPF-82-16] N83-32611
Proposed 60 GHz transmission line system for Electron Cyclotron Radiation Heating (ECRH) on W 7 Advanced Stellarator (AS)
[IPF-82-17] N83-32612
SWEANY (RALPH S.), CROTHERSVILLE, IND.
Small continuous ethanol plant for farm
[DE82-014675] N83-31890
SYSTECH CORP., XENIA, OHIO.
Survey of foreign systems for incineration and energy recovery
[AD-A127461] N83-32181
SYSTEMS AND APPLIED SCIENCES CORP., RIVERDALE, MD.
Final Tactical Decision Aid (FTDA) for infrared (8-12 micrometers) systems, manual version. Appendix B: Insolation and sky radiation tables
[AD-A127853] N83-32699
SYSTEMS SCIENCE AND SOFTWARE, LA JOLLA, CALIF.
Interactive graphics package for the MEGATEK 7250 terminal of the seismic analysis station at the Centre for Seismic Studies
[AD-A127866] N83-32210
SYSTEMS TECHNOLOGY, INC., HAWTHORNE, CALIF.
Elements of simulation error analysis
[AD-A128497] N83-32450
SYSTEMS TECHNOLOGY LAB., INC., ARLINGTON, VA.
Pre-st accident procedures for chemicals and propellants
[AD-A127505] N83-32661

T

TECHNICAL UNIV. OF ISTANBUL (TURKEY).
Dynamic applications of piezoelectric crystals. Part 2: Theoretical studies N83-32084
Dynamic applications of piezoelectric crystals. Part 1: Fundamentals N83-32091
TECHNICOLOR GOVERNMENT SERVICES, INC., MOFFETT FIELD, CALIF.
Integrated resource inventory for southcentral Alaska (INTRISCA)
[NASA-CR-166514] N83-32150
The ABAG biogenic emissions inventory project
[NASA-CR-166498] N83-32151
TECHNISCHE HOCHSCHULE, AACHEN (WEST GERMANY).
Scientific goals of the D1-mission N83-31650
Thermodynamics of irreversible processes in molten its: Problems of interdiffusion measurements under crogravity N83-31662
Solidification front dynamics in model systems N83-31689
HNISCHE UNIVERSITAET, AUSTHAL-ZELLERFELD (WEST GERMANY).
Reactions in glass melt systems N83-31663
HNOLOGY, INC., SAN ANTONIO, TEX.
Temperature cycling in rats exposed repetitively to iofrequency radiation
)-A126895] N83-32281
\VIV UNIV. (ISRAEL).
harge correlations in deep inelastic proton-proton ·actions at the CERN ISR: The axial field spectrometer iboration
33-002324] N83-32539
TENNESSEE UNIV., KNOXVILLE.
Mixed finite element methods with applications to flow and other problems
[AD-A127751] N83-32008
Millimeter microwave emission by use of plasma produced electrons orbiting a positively-charged wire
[AD-A127240] N83-32048
TENNESSEE UNIV., TULLAHOMA.
MIE scattering theory for particle sizing interferometry with the dual beam laser velocimeter
[DE83-009249] N83-32063
TEXAS A&M UNIV., COLLEGE STATION.
FUN.STAT quantile approach to two sample statistical data analysis
[AD-A127672] N83-32467
TEXAS UNIV., AUSTIN.
Interface character of aluminum-graphite metal matrix composites
[AD-A127590] N83-31736
Bis(bipyrazine)ruthenium(II) complexes: Characterization, spectroscopy and electrochemistry
[AD-A127500] N83-31751
Polymer films on electrodes. Part 13: Incorporation of catalysts into electronically conductive polymers: Iron phthalocyanine in polypyrrole
[AD-A127700] N83-31863
Semiconductor electrodes. Part 51: Efficient electroluminescence at ZnS electrode in aqueous electrolytes
[AD-A127454] N83-31966
Digital synthesis of response-design spectrum compatible earthquake records for dynamic analyses N83-32092
Geology and engineering characteristics of selected low-permeability gas sands: A survey
[PB83-195099] N83-32230
The entropic penalty approach to stochastic programming
[AD-A127920] N83-32462
Homocores, cores and operational inefficiency in superadditive N-person games
[AD-A127918] N83-32476
Development of practical MO techniques for prediction of the properties and behavior of materials
[AD-A127029] N83-32524
TEXTRON BELL AEROSPACE CO., BUFFALO, N. Y.
Force method optimization 2. Volume 1: Theoretical development
[AD-A127073] N83-32408
THIOKOL CHEMICAL CORP., BRIGHAM CITY, UTAH.
Polycyclic high energy oxidizers
[AD-A128309] N83-31869
TOHOKU UNIV., SENDAI (JAPAN).
Exact direct-simulation-scheme for the Boltzmann equation/correlation of molecular velocities subject to renewal processes N83-32492
Couette flow in continuum to free molecular regime N83-32493
TOKYO INST. OF TECH. (JAPAN).
Japanese program review of material processing in space N83-31640
Development of an acoustic levitation device with a mirror furnace N83-31656
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia N83-32482
Propagation of light ion beam micro- and macrostabilities of rotating ion layer N83-32483
Rarefaction phenomena in gas ans isotope separation N83-32501
TOKYO UNIV. (JAPAN).
Combustion experiments under microgravity N83-31665
TOSHIBA RESEARCH AND DEVELOPMENT CENTER, KAWASAKI (JAPAN).
The cooling unit for the closed box N83-32507
TRW SPACE TECHNOLOGY LABS., LOS ANGELES, CALIF.
Definition of satellite servicing technology development missions for early space stations
[NASA-CR-170843] N83-31635
Space station needs, attributes and architectural options study review report
[NASA-CR-172947] N83-31714
Space station needs, attributes and architectural options study commercialization working group briefing
[NASA-CR-172948] N83-31715
Space station needs, attributes and architecture options study technology development working group briefing
[NASA-CR-172949] N83-31716
Space station needs, attributes and architectural options study costing working group briefing
[NASA-CR-172950] N83-31717
Space station needs, attributes and architectural options study mission requirement working group briefing
[NASA-CR-172951] N83-31718
Space station needs, attributes and architectural options study system working group briefing
[NASA-CR-172952] N83-31719
TRW SPACE TECHNOLOGY LABS., REDONDO BEACH, CALIF.
Definition of satellite servicing technology development missions for early space stations. Volume 2: Technical
[NASA-CR-170844] N83-31634
Applications of Josephson junction SQUIDs Superconducting Quantum Interference Device) and Arrays
[AD-A127135] N83-31962
DSCS 2 LLTWTA helix current anomaly
[AD-A128008] N83-31972
TSUKUBA UNIV. (JAPAN).
Flow field visualization of vapor condensation in the enclosure N83-32504

U

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, RISLEY (ENGLAND).
The behaviour of welded high strength grain-refined steels under cathodic stress corrosion cracking conditions
[BLL-RISLEY-TR-4741-(9091.9F)] N83-31802
UNITED RESEARCH CORP., SANTA MONICA, CALIF.
Rotational and irrotational freestream disturbances interacting inviscidly with a semi-infinite plate
[AD-A127009] N83-31998
UNIVERSIDAD POLITECNICA DE MADRID (SPAIN).
Bubble motion under reduced gravity N83-31644
Almost cylindrical isorotating liquid bridges for small bond numbers N83-31676
Conservation laws for liquid bridges N83-31677
The breaking of axisymmetric noncylindrical liquid bridges N83-31678
Stability of axisymmetric liquid bridges N83-31679
UNIVERSITY COLL., LONDON (ENGLAND).
Global atmospheric waves: Mechanical heating of the lower thermosphere
[AD-A127222] N83-32206
UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
Multiple state models with covariates: Analysis and Simulation
[AD-A127439] N83-32409
Unimolecular reactions of nitrites and nitrates
[AD-A127825] N83-32528
UNIVERSITY OF TECHNOLOGY, LEICESTER (ENGLAND).
Vibration analysis of piston engines with application to noise control N83-32083
Finite difference methods in vibration analysis N83-32090
UTAH STATE UNIV., LOGAN.
Evaluation of water conservation techniques in the Upper Colorado River Basin
[PB83-175315] N83-32164
Atmospheric temperature profiles from Earth limb infrared measurements
[AD-A127536] N83-32214
UTAH UNIV., SALT LAKE CITY.
Contact noise in superionic ceramics
[AD-A127824] N83-31870

V

VEDA, INC., ARLINGTON, VA.
Computer Aided System for Developing Aircrew Training (CASDAT)
[AD-A128530] N83-31615
VEREINIGTE FLUGTECHNISCHE WERKE G.M.B.H., BREMEN (WEST GERMANY).
Development of a cryogenic windtunnel balance
[KB-TE-1-1173] N83-31611
VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
An experimental study of pressures on 60 deg Delta wings with leading edge vortex flaps
[NASA-CR-172833] N83-31576
Legal and administrative systems for water allocation and management: Options for change. Seven perspectives on aspects of water resource planning in the southeastern states
[PB83-187120] N83-32173
Ecological consequences of a CO2-induced climatic change on forest ecosystems, volume 2, part 13
[DOE/EV-10019/13-VOL-2-PT-13] N83-32188
VOUGHT CORP., DALLAS, TEX.
Development of deployable structures for large space platform systems. Volume 1: Executive summary
[NASA-CR-170838] N83-31632
VOUGHT CORP. ADVANCED TECHNOLOGY CENTER, INC., DALLAS, TEX.
Roll-bonded 300M/1010 steel metal-metal laminates: Forgeability, toughness, fatigue, and stress corrosion
[AD-A127541] N83-31826

W

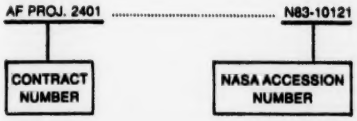
WASHINGTON UNIV., SEATTLE.
Oscillating neutrons and disappearing baryons: A theoretical overview
[DE83-004929] N83-32553

WEATHER SQUADRON (31ST), APO NEW YORK, N.Y. DETACHMENT 25.
Terminal forecast reference notebook for Ramstein AB, Germany
[AD-A128319] N83-32240
WEIZMANN INST. OF SCIENCE, REHOVOTH (ISRAEL).
Residual-stress characterization by use of elastic-wave-scattering measurements
[DE83-000647] N83-31985
WEST VIRGINIA UNIV., MORGANTOWN.
Improving watershed-model accuracy by using digital topography
[PB83-178137] N83-32165
WISCONSIN UNIV., MADISON.
A variational approach to surface solitary waves
[AD-A127707] N83-32000
Explicit smooth velocity kernels for vortex methods
[AD-A127781] N83-32007
Accurate computations for steep solitary waves
[AD-A127706] N83-32261
Bivariate cardinal interpolation by splines on a three-direction mesh
[AD-A127939] N83-32412
A nonlinear integral equation occuring in a singular free boundary problem
[AD-A127940] N83-32413
A condition number for differentiable convex inequalities
[AD-A127941] N83-32414
An iterative method for solving finite difference approximations to Stokes equations
[AD-A127704] N83-32415
On polynomial approximation in the uniform norm by the discrete least squares method
[AD-A127693] N83-32420
Existence of viscosity solutions of Hamilton-Jacobi equations
[AD-A127691] N83-32421
An interface tracking algorithm for the porous medium equation
[AD-A127685] N83-32422
A boundary value problem for quasilinear degenerate parabolic equations
[AD-A127729] N83-32424
A singular perturbation approach for the analysis of the fundamental semiconductor equation
[AD-A127728] N83-32425
On collocation schemes for quasilinear singularity perturbed boundary value problems
[AD-A127727] N83-32426
Malliavin's calculus and stochastic integral representations of functionals of diffusion processes
[AD-A127726] N83-32427
Quasiresonance of long life
[AD-A127763] N83-32442
Self-reflecting skew polygons and polytopes in the 4-dimensional hypercube
[AD-A127762] N83-32443
On confidence intervals for cyclic regenerative processes
[AD-A127761] N83-32444
Differential games and representation formulas for solutions of Hamilton-Jacobi-Isaacs equations
[AD-A127758] N83-32445
Some aspects of critical point theory
[AD-A127757] N83-32446
Stable viscosity matrices for systems of conservation laws
[AD-A127759] N83-32447
A small sample evaluation of a Bayesian design method for quantal response model
[AD-A127942] N83-32464
Bayesian models for response surfaces of uncertain functional form
[AD-A127703] N83-32465
Estimation of a filtered marked Poisson process from noisy observations with applications to signal processing
[AD-A127692] N83-32466
The importance of practice in the development of statistics
[AD-A127705] N83-32470
Computational implementation of the multivariate Halley method for solving nonlinear systems of equations
[AD-A127782] N83-32472
Balanced subclassification in observational studies using the propensity score: A case study
[AD-A127760] N83-32473
Iterative noise elimination preliminary report
[AD-A127756] N83-32519
WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
Bibliography of technical reports, 1982
[PB83-191064] N83-32274
WYOMING UNIV., LARAMIE.
Cloud physics studies in SCPP (Sierra Cooperative Pilot Project) during 1977-82 and in Utah/1978
[PB83-161307] N83-32248

Y

YALE UNIV., NEW HAVEN, CONN.
Classifying bugs is a tricky business N83-32365
YORK UNIV., DOWNSVIEW (ONTARIO).
Bis(bipyrazine)ruthenium(II) complexes: Characterization, spectroscopy and electrochemistry
[AD-A127500] N83-31751

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

AF PROJ. AFSD N83-32662
AF PROJ. ILIR N83-31735
AF PROJ. 327A N83-31569
AF PROJ. 672A N83-32030
AF PROJ. 0100 ..... N83-31754
AF PROJ. 0220-81 ..... N83-32402
AF PROJ. 1900 ..... N83-32053
AF PROJ. 2029 ..... N83-32209
AF PROJ. 2301 ..... N83-31745
N83-32046
N83-32061
N83-32062
N83-32509
N83-32525
AF PROJ. 2303 ..... N83-31750
N83-31866
N83-32051
N83-32524
N83-32529
N83-32615
AF PROJ. 2304 ..... N83-31932
N83-31948
N83-31963
N83-32002
N83-32008
N83-32373
N83-32374
N83-32403
N83-32409
N83-32411
N83-32419
N83-32429
N83-32430
N83-32431
N83-32433
N83-32435
N83-32438
N83-32449
N83-32450
N83-32463
N83-32469
N83-32471
N83-32474
N83-32475
N83-32583
AF PROJ. 2305 ..... N83-31939
N83-31943
N83-32579
AF PROJ. 2306 ..... N83-32101
AF PROJ. 2307 ..... N83-31580
N83-31605
N83-31737
N83-31756
N83-32097
N83-32105
N83-32367
N83-32408
AF PROJ. 2308 ..... N83-31721
N83-31755
N83-31756
N83-31758
N83-32001
AF PROJ. 2309 ..... N83-32211
AF PROJ. 2310 ..... N83-32208
N83-32214
N83-32220
AF PROJ. 2311 ..... N83-32691
N83-32697
N83-32698
N83-32701
AF PROJ. 2313 ..... N83-32297
AF PROJ. 2338 ..... N83-31570
AF PROJ. 2394 ..... N83-32401
AF PROJ. 2401 ..... N83-31582
N83-32106
N83-32107
AF PROJ. 2419 ..... N83-31739
AF PROJ. 2688 ..... N83-32236
N83-32699
AF PROJ. 3012 ..... N83-31997
AF PROJ. 3066 ..... N83-31606
N83-31738
AF PROJ. 3763 ..... N83-31974
AF PROJ. 4600 ..... N83-31933
N83-32052
AF PROJ. 4643 ..... N83-32209
AF PROJ. 5581 ..... N83-32380
AF PROJ. 6095 ..... N83-32054
AF PROJ. 6670 ..... N83-32237
AF PROJ. 6690 ..... N83-32213
AF PROJ. 7659 ..... N83-31583
AF PROJ. 7757 ..... N83-32281
N83-32282
AF PROJ. 7930 ..... N83-31722
AF-AFOSR-ISSA-00013-83 ..... N83-31862
AF-AFOSR-0008-79 ..... N83-32524
AF-AFOSR-0014-81 ..... N83-32373
AF-AFOSR-0014-82 ..... N83-32691
AF-AFOSR-0020-80 ..... N83-31927
AF-AFOSR-0024-81 ..... N83-31745
AF-AFOSR-0024-82 ..... N83-32463
AF-AFOSR-0043-79 ..... N83-32403
N83-32435
N83-32474
AF-AFOSR-0045-82 ..... N83-32046
AF-AFOSR-0046-82 ..... N83-32529
AF-AFOSR-0065-82 ..... N83-32001
AF-AFOSR-0079-79 ..... N83-31737
AF-AFOSR-0082-82 ..... N83-32048
AF-AFOSR-0083-83 ..... N83-32008
AF-AFOSR-0084-81 ..... N83-31581
AF-AFOSR-0091-80 ..... N83-32002
AF-AFOSR-0112-82 ..... N83-31932
AF-AFOSR-0138-79 ..... N83-32062
AF-AFOSR-0142-82 ..... N83-32105
AF-AFOSR-0151-82 ..... N83-32615
AF-AFOSR-0153-82 ..... N83-32214
AF-AFOSR-0160-81 ..... N83-32525
AF-AFOSR-0162-81 ..... N83-32409
AF-AFOSR-0170-80 ..... N83-32433
N83-32469
N83-32471
AF-AFOSR-0187-82 ..... N83-32430
N83-32431
AF-AFOSR-0189-80 ..... N83-31963
AF-AFOSR-0211-80 ..... N83-32430
AF-AFOSR-0214-82 ..... N83-32698
AF-AFOSR-0221-81 ..... N83-32411
AF-AFOSR-0223-82 ..... N83-31725
AF-AFOSR-0230-83 ..... N83-31999
AF-AFOSR-0235-83 ..... N83-32208
AF-AFOSR-0251-81 ..... N83-31605
AF-AFOSR-0340-82 ..... N83-32402
AF-AFOSR-0343-82 ..... N83-32419
AF-AFOSR-0345-82 ..... N83-32297
AF-AFOSR-2577A-74 ..... N83-31998
AF-AFOSR-3236-77 ..... N83-32475
AF-AFOSR-3333-77 ..... N83-31755
AF-AFOSR-3505-78 ..... N83-31750
AF-AFOSR-3513-78 ..... N83-32051
AF-AFOSR-3596-78 ..... N83-32374
AF-AFOSR-3695-78 ..... N83-31948
ARO-483964-25530 ..... N83-32447
ARPA ORDER 3291 ..... N83-32211
ARPA ORDER 4104 ..... N83-31822
ARPA ORDER 4353 ..... N83-32210
ARPA ORDER 4384 ..... N83-32616
BMFT-01-QV-070-ZA/SN N83-31697
BMFT-01-QV-148-ZA-SN-SLN-7786 ..... N83-31671
CNR-82/002/SAS N83-31673
DA PROJ. 1L1-61101-A-71A N83-31671
DA PROJ. 1L1-61102-AH-42 ..... N83-32620
DA PROJ. 1L1-61102-AH-43 ..... N83-31584
N83-31706
N83-32106
DA PROJ. 1L1-61102-AH-44 ..... N83-31740
DA PROJ. 1L1-61102-AH-60 ..... N83-32099
DA PROJ. 1L1-61102-AH043 ..... N83-32057
DA PROJ. 1L1-62209-AH-76 ..... N83-31572
N83-31589
DA PROJ. 1L2-62209-AH-76 ..... N83-32518
DA PROJ. 1T1-61102-BH-57 ..... N83-32103
DA PROJ. 1X4-63707-04-37 ..... N83-31965
DA PROJ. 3E1-62771-A-804 ..... N83-32291
DA PROJ. 3E1-62777-A-879 ..... N83-32296
N83-32298
N83-32300
DA PROJ. 3M1-61101-BS-10 ..... N83-32299
DA PROJ. 4A1-61102-AT-24 ..... N83-32262
DA PROJ. 4A7-62731-AT-41 ..... N83-31620
DA PROJ. 4A7-62781-AT-45 ..... N83-31964
DA PROJ. 154-63749-D-462 ..... N83-32588
DAAB07-82-C-J231 ..... N83-31965
DAAD07-80-D-0206 ..... N83-32234
DAAE07-82-C-4040 ..... N83-31699
N83-31900
N83-31901
N83-31902
DAAG29-78-C-0006 ..... N83-32362
DAAG29-79-C-0035 ..... N83-31819
DAAG29-79-C-0148 ..... N83-32584
DAAG29-79-C-0171 ..... N83-32398
DAAG29-79-C-0174 ..... N83-32617
DAAG29-80-C-0041 ..... N83-32000
N83-32007
N83-32261
N83-32412
N83-32413
N83-32414
N83-32415
N83-32420
N83-32421
N83-32422
N83-32424
N83-32425
N83-32426
N83-32442
N83-32443
N83-32444
N83-32445
N83-32446
N83-32447
N83-32464
N83-32465
N83-32466
N83-32470
N83-32472
N83-32473
N83-32519
DAAG29-80-C-0064 ..... N83-32102
DAAG29-80-C-0065 ..... N83-31748
DAAG29-80-C-0137 ..... N83-31864
N83-31865
DAAG29-81-G-0009 ..... N83-32379
DAAG29-81-K-0035 ..... N83-31822
DAAG29-82-K-0016 ..... N83-32098
DAAG29-82-K-0156 ..... N83-32418
DAAG29-83-K-0051 ..... N83-32467
DAAK21-80-C-0004 ..... N83-31928
DAAK30-78-C-0039 ..... N83-31824
DAAK51-79-C-0026 ..... N83-31589
DAAK51-79-C-0059 ..... N83-31572
DACW72-80-C-0004 ..... N83-32265
DAJA37-82-C-0171 ..... N83-32103
DAMD17-80-C-0058 ..... N83-32291
DARPA ORDER 3423 ..... N83-31961
DARPA ORDER 3597 ..... N83-31934

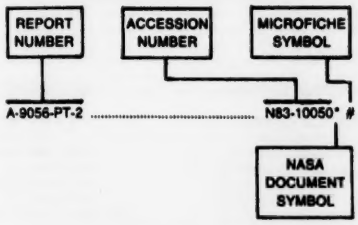
DARPA ORDER 3709 ..... N83-31961
DARPA ORDER 3773 ..... N83-31961
DARPA ORDER 3853 ..... N83-31935
DARPA ORDER 3894 ..... N83-32582
DE-AC02-75CH-00016 ..... N83-32013
DE-AC02-76CH-00016 ..... N83-31778
N83-31787
N83-31978
N83-31987
N83-32041
N83-32245
N83-32512
N83-32539
N83-32543
N83-32550
N83-32551
N83-32559
N83-32561
N83-32570
N83-32591
N83-32592
N83-32630
N83-32636
N83-32638
N83-32639
DE-AC02-76CH-03000 ..... N83-31951
N83-32547
N83-32548
N83-32549
DE-AC02-76CH-03073 ..... N83-31829
N83-32600
N83-32605
DE-AC02-76ER-01195 ..... N83-32389
DE-AC02-76ER-01198 ..... N83-32117
N83-32631
DE-AC02-76ER-01545 ..... N83-32552
DE-AC02-76ET-52040 ..... N83-32607
DE-AC02-77CH-00178 ..... N83-31907
DE-AC02-77EV-04267 ..... N83-32196
DE-AC02-78ET-52027 ..... N83-31827
DE-AC02-79ET-10815 ..... N83-32063
DE-AC02-80ER-10556 ..... N83-31828
DE-AC02-80ER-10740 ..... N83-32642
DE-AC02-80RA-50156 ..... N83-31989
DE-AC02-81ER-10841 ..... N83-32456
DE-AC02-81ER-10915 ..... N83-31873
DE-AC02-81ER-40033 ..... N83-32538
DE-AC02-82ER-12028 ..... N83-32284
DE-AC02-82ER-12089 ..... N83-32182
DE-AC02-87NE-37253 ..... N83-31768
DE-AC03-76SF-0098 ..... N83-32565
DE-AC03-76SF-00098 ..... N83-31727
N83-31764
N83-31765
N83-31766
N83-31771
N83-31782
N83-31832
N83-31833
N83-31834
N83-31835
N83-31839
N83-31905
N83-31981
N83-32014
N83-32015
N83-32018
N83-32072
N83-32073
N83-32197
N83-32283
N83-32455
N83-32510
N83-32511
N83-32513
N83-32541
N83-32542
N83-32546
N83-32554
N83-32556
N83-32590
N83-32593
N83-32627
N83-32629
N83-32632
N83-32633
N83-32645
DE-AC03-76SF-00515 ..... N83-31982
N83-32065
N83-32555
DE-AC04-76DP-00053 ..... N83-31874
N83-32068
DE-AC04-76DP-00613 ..... N83-31880
DE-AC04-76DP-00656 ..... N83-31906
DE-AC04-76DP-00789 ..... N83-31593
N83-31709
N83-31742
N83-31761
N83-31767
N83-31769
N83-31775
N83-31976
N83-31977
N83-31980
N83-32034
N83-32243
N83-32452
N83-32533
N83-32560
N83-32564
N83-32568
N83-32569
N83-32625
N83-32626
N83-32634
N83-32640
N83-32641
DE-AC04-76DP-03533 ..... N83-31762
N83-31770
N83-31875
N83-31881
N83-32247
DE-AC06-76FF-02170 ..... N83-32573
DE-AC06-76RL-01830 ..... N83-31776
N83-31784
N83-31830
N83-31831
N83-32155
N83-32158
N83-32159
N83-32194
N83-32195
N83-32531
N83-32532
N83-32576
DE-AC06-77RL-01030 ..... N83-32225
DE-AC06-81ER-40048 ..... N83-32553
DE-AC07-76ID-01570 ..... N83-32040
N83-32602
DE-AC07-79ID-01675 ..... N83-32572
DE-AC08-76NV-01183 ..... N83-32037
DE-AC09-76SR-00001 ..... N83-31844
N83-32156
N83-32157
DE-AC11-76PN-00014 ..... N83-32351
DE-AC13-76GJ-01664 ..... N83-32156
N83-32157
DE-AC18-81FC-10297 ..... N83-31786
DE-AC19-80BC-10033 ..... N83-31876
DE-AC21-82MC-19301 ..... N83-31763
DE-AC22-78ET-11423 ..... N83-32624
DE-AC22-80PC-30118 ..... N83-32219
DE-AI01-77CS-51044 ..... N83-32687
DE-AS01-79EV-10019 ..... N83-32188
N83-32189
DE-AS05-81ER-53117 ..... N83-32598
DE-FG01-80RA-50318 ..... N83-31889
DE-FG02-80R5-10226 ..... N83-31984
DE-FG02-81AF-92009 ..... N83-31890
DEN3-77 ..... N83-32687
DE83-003699 ..... N83-31979
DI-7-07-83-V0001 ..... N83-32248
DI-14-16-0009-80-1016 ..... N83-32202
DI-14-24-0001-9076 ..... N83-32204
DI-14-34-0001-0110 ..... N83-32163
DI-14-34-0001-0128 ..... N83-32174
DI-14-34-0001-0219 ..... N83-32171
DI-14-34-0001-1152 ..... N83-32165
DI-14-34-0001-1483 ..... N83-32167
DI-14-34-0001-2114 ..... N83-32172
DI-14-34-0001-9036 ..... N83-32168
DI-14-34-0001-9137 ..... N83-32164
DI14-34-0001-2114 ..... N83-32170
DOT-FA79NA-6040 ..... N83-32303
DOT-FH-11-9672 ..... N83-31911
DOT-FH-61-80-P-30115 ..... N83-31912
DTFA01-80-C-10030 ..... N83-31591
DTFA01-81-C-10003 ..... N83-31592
EA-77-A-01-6010 ..... N83-31883
EG-77-C-01-4042 ..... N83-31907
EPA-R-804613 ..... N83-31793
EPA-68-03-2567 ..... N83-32203
EPA-805554 ..... N83-32252
EPRI PROJ. TPS81-822 ..... N83-32079
EPRI PROJ. 1339-1 ..... N83-32193
EPRI PROJ. 2055-3 ..... N83-32113
EPRI PROJ. 2055-8 ..... N83-32114
EPRI PROJ. 7869-1 ..... N83-31983
ET-78-C-02-4687 ..... N83-32341
EY-76-C-02-1545 ..... N83-32552
EY-76-02-0016 ..... N83-31778
FAA PROJ. 184-320-120 ..... N83-31604
F04611-79-C-0009 ..... N83-31866
F04611-80-C-0046 ..... N83-32661
F04611-83-X-0010 ..... N83-31747
F04701-80-C-0022 ..... N83-31972
F04701-80-C-0081 ..... N83-31967
N83-31968
N83-31975
F04701-81-C-0082 ..... N83-31967
N83-31968
N83-31971
N83-31975
F04701-82-C-0083 ..... N83-31967
N83-31968
N83-31971
N83-31975
N83-32047
N83-32216
F04702-80-C-0081 ..... N83-31971
F19628-80-C-0002 ..... N83-32053
F19628-81-C-0042 ..... N83-32699
F19628-81-K-0004 ..... N83-32701
F19628-81-K-0011 ..... N83-32209
F19628-81-K-0033 ..... N83-32207
F19628-82-C-0001 ..... N83-31937
F19628-83-C-0001 ..... N83-32400
F29601-78-C-0082 ..... N83-31974
F29601-81-C-0013 ..... N83-32097
F30602-78-C-0083 ..... N83-31943
F30602-79-C-0200 ..... N83-31570
F30602-80-C-0264 ..... N83-31939
F30602-81-C-0178 ..... N83-32308
F33601-81-M-B516 ..... N83-32107
F33615-77-C-5155 ..... N83-31735
F33615-77-C-5221 ..... N83-31606
N83-31738
F33615-78-C-1551 ..... N83-31934
F33615-79-C-2065 ..... N83-31997
F33615-80-C-0614 ..... N83-32281
F33615-80-C-3214 ..... N83-32387
N83-32408
F33615-81-C-3606 ..... N83-32450
F33615-81-C-5018 ..... N83-31574
N83-32667
F33615-81-C-5056 ..... N83-31739
F33615-81-K-1539 ..... N83-32434
F33615-82-C-0604 ..... N83-31945
N83-32293
F33615-82-R-5097 ..... N83-32078
F40600-79-C-0002 ..... N83-31998
F49620-78-C-0018 ..... N83-32208
F49620-79-C-0020 ..... N83-32341
F49620-80-C-0018 ..... N83-32211
F49620-80-C-0023 ..... N83-32509
F49620-81-C-0042 ..... N83-32220
F49620-81-C-0079 ..... N83-32061
F49620-81-C-0084 ..... N83-31758
F49620-81-C-0086 ..... N83-32579
F49620-81-K-0007 ..... N83-32101
F49620-82-C-0009 ..... N83-32438
N83-32449
F49620-82-C-0013 ..... N83-31721
F49620-82-C-0043 ..... N83-31580
F49620-82-C-0071 ..... N83-32583
F49620-82-K-0001 ..... N83-32429
F49620-82-K-0009 ..... N83-32401
HDL PROJ. 330933 ..... N83-32588
HUD-H-2850R N83-32186
JC1/0125 ..... N83-32514
MDA903-79-C-0680 ..... N83-31961
MDA903-80-C-0107 ..... N83-31961
MDA903-80-C-0193 ..... N83-31935
MDA903-80-C-0432 ..... N83-31961
MDA903-81-C-0320 ..... N83-32582
MDA903-81-C-0365 ..... N83-32462
MDA903-81-C-0521 ..... N83-32210
MDA903-82-C-0159 ..... N83-32616
MF5852402C N83-32279
MF58524005 ..... N83-32290
MIPR-ARO-21-78 ..... N83-32236
MIPR-FY1218203062 ..... N83-32697
MM&T PROJ. T785097 ..... N83-31824
MO095001 ..... N83-32315
MR0000101 ..... N83-32309
MR04101003 ..... N83-32309
M0096PN001 ..... N83-32304
NAG1-274 ..... N83-31576
NASA ORDER H-46856-B N83-32027
NASA ORDER L-4703-B N83-32027
NASA ORDER S-12407-C N83-32128
NASW-3204 ..... N83-32657
NASW-3281 ..... N83-31996
NASW-3387 ..... N83-32696
NASW-3541 ..... N83-32277
NASW-3542 ..... N83-31579
N83-31956
NASW-3681 ..... N83-31714

N83-31715
N83-31716
N83-31717
N83-31718
N83-31719
NAS1-14101 ..... N83-32341
NAS1-14869 ..... N83-31595
NAS1-14887 ..... N83-31733
NAS1-16000 ..... N83-32352
NAS2-10021 ..... N83-31602
NAS2-10061 ..... N83-31732
NAS2-10130 ..... N83-31731
NAS2-10238 ..... N83-31724
NAS2-10855 ..... N83-31597
NAS2-11101 ..... N83-32150
N83-32151
NAS2-11184 ..... N83-31586
NAS2-11555 ..... N83-31578
NAS3-20807 ..... N83-32070
NAS3-22823 ..... N83-31886
NAS3-22893 ..... N83-31925
N83-31926
NAS5-24420 ..... N83-32700
NAS5-27323 ..... N83-32146
NAS5-27384 ..... N83-32142
NAS5-27463 ..... N83-32135
N83-32141
NAS5-27580 ..... N83-32139
NAS6-3200 ..... N83-32180
NAS8-32952 ..... N83-31685
NAS8-33378 ..... N83-32205
NAS8-33548 ..... N83-31744
NAS8-33573 ..... N83-31818
NAS8-34383 ..... N83-32522
NAS8-34678 ..... N83-31632
NAS8-34906 ..... N83-32344
NAS8-34908 ..... N83-32069
NAS8-35056 ..... N83-31612
NAS8-35081 ..... N83-31634
N83-31635
NAS9-15800 ..... N83-32133
N83-32134
NAS9-16670 ..... N83-31705
NAS10-10285 ..... N83-32286
NB81-NADA-2044 ..... N83-31915
NCC2-4 ..... N83-32301
N83-32302
NCC2-81 ..... N83-31723
NCC2-106 ..... N83-31590
NGL-22-009-124 ..... N83-32417
NGR-05-020-559 ..... N83-32700
NGR-21-001-111 ..... N83-32306
NOAA-04-8-M01-79 ..... N83-32276
NR PROJ. 044-422 ..... N83-32434
NR PROJ. 047-619 ..... N83-32477
NR PROJ. 048-659 ..... N83-32434
NR PROJ. 051-693 ..... N83-31751
N83-31863
N83-31966
NR PROJ. 051-782 ..... N83-32032
NR PROJ. 061-244 ..... N83-32004
NR PROJ. 083-603 ..... N83-32266
NR PROJ. 092-555 ..... N83-31856
N83-31857
N83-31858
N83-31867
NR PROJ. 170-940 ..... N83-32310
N83-32311
NR PROJ. 356-504 ..... N83-31859
NR PROJ. 359-830 ..... N83-32182
NR PROJ. 625-830 ..... N83-32182
NR-42-284 ..... N83-32437
NRC-FIN-B6568 ..... N83-32118
NSF ATM-77-20580 ..... N83-32700
NSF ATM-78-08865 ..... N83-32236
NSF ATM-80-06099 ..... N83-32257
NSF ATM-80-13153 ..... N83-32239
NSF CEE-81-11095 ..... N83-32228
N83-32229
NSF CHE-80-22874 ..... N83-32529
NSF DPP-77-19565 ..... N83-32262
NSF EAR-80-18819 ..... N83-32614
NSF MCS-78-05299 ..... N83-32096
NSF MCS-78-25824 ..... N83-31934
NSF MCS-78-228116 ..... N83-32670
NSF MCS-79-04426 ..... N83-32000
NSF MCS-79-27062 ..... N83-32412
N83-32413
N83-32425
N83-32426
N83-32447
N83-32466
NSF MCS-80-01960 ..... N83-32261
N83-32442
NSF MCS-81-01586 ..... N83-32519
NSF MCS-81-01639 ..... N83-32007
NSF MCS-81-02360 ..... N83-32007
N83-32447
NSF MCS-81-02846 ..... N83-32445
NSF MCS-81-08814 ..... N83-32263
NSF MCS-81-10556 ..... N83-32446
NSF MCS-82-00632 ..... N83-32414
NSF MCS-83-00293 ..... N83-32422
NSF MEA-82-00743 ..... N83-31914
NSF OCE-78-26229 ..... N83-32276
NSG-2198 ..... N83-32529
NSG-5123 ..... N83-32360
N00014-75-C-0209 ..... N83-32266
N00014-75-C-0442 ..... N83-32418
N00014-75-C-0473 ..... N83-32006
N00014-75-C-0972 ..... N83-32218
N00014-76-C-0013 ..... N83-32381
N83-32436
N00014-76-C-0089 ..... N83-32006
N00014-76-C-0200 ..... N83-31859
N00014-76-C-0207 ..... N83-32700
N00014-76-C-0370 ..... N83-32376
N83-32434
N00014-76-C-0408 ..... N83-31856
N83-31857
N83-31858
N83-31867
N00014-76-C-0455 ..... N83-32461
N00014-76-C-0911 ..... N83-32278
N00014-77-C-0008 ..... N83-32004
N00014-77-C-0224 ..... N83-32417
N00014-77-C-0623 ..... N83-32096
N83-32439
N83-32440
N00014-77-C-0641 ..... N83-32341
N00014-78-C-0035 ..... N83-31753
N00014-78-C-0094 ..... N83-31736
N00014-78-C-0325 ..... N83-32058
N83-32586
N00014-78-C-0467 ..... N83-32478
N00014-78-C-0592 ..... N83-31751
N83-31863
N83-31966
N00014-79-C-0685 ..... N83-32477
N00014-80-C-0048 ..... N83-32263
N00014-80-C-0236 ..... N83-32434
N00014-80-C-0443 ..... N83-32061
N00014-80-C-0455 ..... N83-32096
N00014-80-C-0467 ..... N83-32306
N00014-80-C-0472 ..... N83-32059
N00014-80-C-0505 ..... N83-32313
N83-32399
N83-32580
N00014-80-C-0539 ..... N83-32528
N00014-80-C-0795 ..... N83-31861
N00014-81-C-0204 ..... N83-31869
N00014-81-C-0210 ..... N83-32003
N00014-81-C-0236 ..... N83-32476
N00014-81-C-0335 ..... N83-32307
N00014-81-C-0418 ..... N83-32032
N00014-81-C-0615 ..... N83-31962
N00014-81-C-0699 ..... N83-32305
N00014-81-C-2522 ..... N83-32056
N00014-81-K-0095 ..... N83-32466
N00014-81-K-0323 ..... N83-31958
N83-31959
N83-31960
N00014-81-K-0408 ..... N83-31746
N00014-82-C-0173 ..... N83-32386
N00014-82-C-0718 ..... N83-32385
N00014-82-C-2037 ..... N83-32005
N00014-82-C-2108 ..... N83-32581
N00014-82-K-0265 ..... N83-32619
N00014-82-K-0295 ..... N83-32462
N83-32476
N00014-82-K-0334 ..... N83-32313
N00014-82-K-0423 ..... N83-32182
N00014-82-K-0449 ..... N83-32310
N83-32311
N00014-82-K-0496 ..... N83-31823
N00014-82-K-0523 ..... N83-31749
N00014-82-K-0603 ..... N83-31870
N00014-82-K-0714 ..... N83-32365
N00014-82-K-2015 ..... N83-31857
N00014-83-F-0002 ..... N83-32527
N00019-80-C-0575 ..... N83-31826
N00019-81-C-0424 ..... N83-31931
N00019-81-C-0541 ..... N83-32432
N00024-79-C-6043 ..... N83-32104
N83-32589
N00030-83-AF-31319 ..... N83-32441
N00039-81-C-0183 ..... N83-32384
N00173-80-C-0572 ..... N83-32618
N00228-81-C-H361 ..... N83-32233
N61339-79-D-0007 ..... N83-32664
N83-32665
N61339-80-D-0009 ..... N83-31615
N62269-81-C-0742 ..... N83-32288
N62474-82-C-8270 ..... N83-32217
N62583-82-MT-150 ..... N83-32181
N66314-70-A-0067 ..... N83-31614
N66314-70-A-0081 ..... N83-31903
N68335-81-C-4587 ..... N83-31752
PROJ. AGRISTARS N83-32129
N83-32130
N83-32131
N83-32132
N83-32133
N83-32134
RR011094E N83-32526
RR0010841 ..... N83-32428
RR0110843 ..... N83-32520
RR0140241 ..... N83-31720
RR0140501 ..... N83-32437
RR0210542 ..... N83-31941
RR0220148 ..... N83-31825
RR0330242 ..... N83-32027
RR0340643 ..... N83-32703
RR0420602 ..... N83-32305
RR0420801 ..... N83-32310
N83-32311
SAI PROJ. 1-157-18-519-00 ..... N83-32005
SF33341401 ..... N83-32468
SRC-GR/B/23250 ..... N83-31991
N83-32459
SRI PROJ. 2777 ..... N83-32101
SR0230101 ..... N83-32003
SSS PROJ. 11178 ..... N83-32210
TEXAS-A&M PROJ. 4858 ..... N83-32467
T15-LM07001 ..... N83-32674
W-31-109-ENG-38 ..... N83-31759
N83-31760
N83-31836
N83-31872
N83-32010
N83-32019
N83-32033
N83-32391
N83-32537
N83-32621
N83-32622
N83-32623
W-7405-ENG-26 ..... N83-31777
N83-31838
N83-31891
N83-31904
N83-31988
N83-32011
N83-32016
N83-32021
N83-32022
N83-32035
N83-32112
N83-32244
N83-32521
N83-32535
N83-32544
N83-32597
N83-32601
N83-32668
W-7405-ENG-36 ..... N83-31772
N83-31773
N83-31774
N83-31840
N83-31985
N83-31986
N83-32020
N83-32036
N83-32038
N83-32039
N83-32080
N83-32116
N83-32198
N83-32388
N83-32390
N83-32453
N83-32454
N83-32457
N83-32534
N83-32540
N83-32545
N83-32571
N83-32574
N83-32575
N83-32603
N83-32604
N83-32608
N83-32628
N83-32637
W-7405-ENG-48 ..... N83-31741
N83-31781
N83-31860
N83-31877

N83-31949
N83-31950
N83-32017
N83-32221
N83-32224
N83-32242
N83-32348
N83-32392
N83-32451
N83-32530
N83-32536
N83-32558
N83-32566
N83-32567
N83-32606
N83-32609
W-7405-ENG-82 ..... N83-31779
N83-31780
N83-31785
N83-31788
N83-31821
N83-31837
N83-31841
N83-31842
N83-31843
N83-31845
N83-31846
N83-31847
N83-31878
N83-31879
N83-31985
N83-32100
N83-32116
N83-32119
N83-32557
N83-32635
N83-32643
WF41460000 ..... N83-31752
XF62583005 ..... N83-32056
X0792SB N83-31930
ZF51524002 ..... N83-32304
ZF66111001 ..... N83-32663
ZR0000101 ..... N83-32264
ZR000001180 ..... N83-32217
505-31-21 ..... N83-31578
505-31-51 ..... N83-31597
505-40-21 ..... N83-32301
N83-32302
505-42-39-69 ..... N83-31596
505-44-21 ..... N83-32676
505-45-11 ..... N83-31586
506-51-11 ..... N83-32397
506-53-43-01 ..... N83-32095
506-54-21 ..... N83-31957
506-55-13-01 ..... N83-32044
506-63-32-01 ..... N83-31636
534-03-13-01 ..... N83-31730
650-60-26 ..... N83-31925
N83-31926
678-12-03-07 ..... N83-32028
986-15-10-04 ..... N83-31713

REPORT / ACCESSION NUMBER INDEX

Typical Report / Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-9357 ..... N83-32676* #
A-9404 ..... N83-32397* #
A-9414 ..... N83-31957* #

ACEE-03-PR-9642 ..... N83-31595* #

AD-A126855 ..... N83-32288 #
AD-A126870 ..... N83-32282 #
AD-A126895 ..... N83-32281 #
AD-A126931 ..... N83-32698 #
AD-A126934 ..... N83-32291 #
AD-A126961 ..... N83-32672 #
AD-A126977 ..... N83-32307 #
AD-A126991 ..... N83-32089 #
AD-A126994 ..... N83-32407 #
AD-A126996 ..... N83-32406 #
AD-A126999 ..... N83-31858 #
AD-A127000 ..... N83-31856 #
AD-A127006 ..... N83-31857 #
AD-A127007 ..... N83-32207 #
AD-A127009 ..... N83-31998 #
AD-A127010 ..... N83-32096 #
AD-A127012 ..... N83-31704 #
AD-A127014 ..... N83-31734 #
AD-A127016 ..... N83-32220 #
AD-A127018 ..... N83-32523 #
AD-A127019 ..... N83-31960 #
AD-A127020 ..... N83-31959 #
AD-A127021 ..... N83-31958 #
AD-A127023 ..... N83-31927 #
AD-A127024 ..... N83-32579 #
AD-A127029 ..... N83-32524 #
AD-A127030 ..... N83-32234 #
AD-A127031 ..... N83-31745 #
AD-A127038 ..... N83-31963 #
AD-A127040 ..... N83-31924 #
AD-A127042 ..... N83-32208 #
AD-A127043 ..... N83-31581 #
AD-A127044 ..... N83-32048 #
AD-A127045 ..... N83-31929 #
AD-A127055 ..... N83-31725 #
AD-A127058 ..... N83-32580 #
AD-A127060 ..... N83-31928 #
AD-A127061 ..... N83-32660 #
AD-A127063 ..... N83-32096 #
AD-A127073 ..... N83-32408 #
AD-A127074 ..... N83-32313 #
AD-A127075 ..... N83-32047 #
AD-A127079 ..... N83-32097 #
AD-A127083 ..... N83-31820 #
AD-A127090 ..... N83-31859 #
AD-A127109 ..... N83-32615 #
AD-A127116 ..... N83-31819 #
AD-A127118 ..... N83-31999 #
AD-A127122 ..... N83-32697 #
AD-A127126 ..... N83-32659 #
AD-A127129 ..... N83-31721 #
AD-A127130 ..... N83-32233 #
AD-A127132 ..... N83-32399 #
AD-A127135 ..... N83-31962 #
AD-A127136 ..... N83-32461 #
AD-A127140 ..... N83-31580 #
AD-A127147 ..... N83-32372 #
AD-A127148 ..... N83-32691 #
AD-A127153 ..... N83-31961 #
AD-A127157 ..... N83-31591 #
AD-A127172 ..... N83-32306 #
AD-A127219 ..... N83-31997 #
AD-A127222 ..... N83-32206 #
AD-A127240 ..... N83-32046 #
AD-A127246 ..... N83-31931 #
AD-A127254 ..... N83-32658 #
AD-A127281 ..... N83-32305 #
AD-A127326 ..... N83-32280 #
AD-A127327 ..... N83-32290 #
AD-A127337 ..... N83-32304 #
AD-A127370 ..... N83-32279 #
AD-A127438 ..... N83-32345 #
AD-A127439 ..... N83-32409 #
AD-A127440 ..... N83-31607 #
AD-A127446 ..... N83-32235 #
AD-A127447 ..... N83-32099 #
AD-A127451 ..... N83-32292 #
AD-A127454 ..... N83-31966 #
AD-A127457 ..... N83-32182 #
AD-A127458 ..... N83-31750 #
AD-A127459 ..... N83-32430 #
AD-A127460 ..... N83-32468 #
AD-A127461 ..... N83-32181 #
AD-A127462 ..... N83-31965 #
AD-A127466 ..... N83-32001 #
AD-A127467 ..... N83-31867 #
AD-A127469 ..... N83-31866 #
AD-A127477 ..... N83-32211 #
AD-A127479 ..... N83-31708 #
AD-A127480 ..... N83-31707 #
AD-A127486 ..... N83-32429 #
AD-A127488 ..... N83-31749 #
AD-A127492 ..... N83-31737 #
AD-A127495 ..... N83-31569 #
AD-A127496 ..... N83-32673 #
AD-A127500 ..... N83-31751 #
AD-A127501 ..... N83-32289 #
AD-A127502 ..... N83-32584 #
AD-A127504 ..... N83-32105 #
AD-A127505 ..... N83-32661 #
AD-A127508 ..... N83-32153 #
AD-A127512 ..... N83-31722 #
AD-A127514 ..... N83-32694 #
AD-A127515 ..... N83-31938 #
AD-A127516 ..... N83-32238 #
AD-A127517 ..... N83-32213 #
AD-A127519 ..... N83-32054 #
AD-A127520 ..... N83-31937 #
AD-A127521 ..... N83-32237 #
AD-A127522 ..... N83-32431 #
AD-A127527 ..... N83-32212 #
AD-A127529 ..... N83-32104 #
AD-A127534 ..... N83-31903 #
AD-A127535 ..... N83-32469 #
AD-A127536 ..... N83-32214 #
AD-A127538 ..... N83-32662 #
AD-A127539 ..... N83-31753 #
AD-A127541 ..... N83-31826 #
AD-A127544 ..... N83-32434 #
AD-A127545 ..... N83-32382 #
AD-A127548 ..... N83-31570 #
AD-A127553 ..... N83-31583 #
AD-A127557 ..... N83-31598 #
AD-A127559 ..... N83-32478 #
AD-A127562 ..... N83-32278 #
AD-A127564 ..... N83-32377 #
AD-A127566 ..... N83-32152 #
AD-A127569 ..... N83-32582 #
AD-A127570 ..... N83-32052 #
AD-A127571 ..... N83-31822 #
AD-A127572 ..... N83-32376 #
AD-A127573 ..... N83-32617 #
AD-A127579 ..... N83-31613 #
AD-A127583 ..... N83-31862 #
AD-A127585 ..... N83-32051 #
AD-A127590 ..... N83-31736 #
AD-A127604 ..... N83-32419 #
AD-A127608 ..... N83-32045 #
AD-A127611 ..... N83-32314 #
AD-A127612 ..... N83-32050 #
AD-A127616 ..... N83-32581 #
AD-A127618 ..... N83-32260 #
AD-A127624 ..... N83-32418 #
AD-A127638 ..... N83-32618 #
AD-A127639 ..... N83-32423 #
AD-A127651 ..... N83-32379 #
AD-A127652 ..... N83-32700* #
AD-A127657 ..... N83-32315 #
AD-A127660 ..... N83-31748 #
AD-A127663 ..... N83-31824 #
AD-A127667 ..... N83-32398 #
AD-A127671 ..... N83-31934 #
AD-A127672 ..... N83-32467 #
AD-A127673 ..... N83-32236 #
AD-A127674 ..... N83-32677 #
AD-A127676 ..... N83-32378 #
AD-A127685 ..... N83-32422 #
AD-A127691 ..... N83-32421 #
AD-A127692 ..... N83-32466 #
AD-A127693 ..... N83-32420 #
AD-A127694 ..... N83-32347 #
AD-A127699 ..... N83-31823 #
AD-A127700 ..... N83-31863 #
AD-A127701 ..... N83-32102 #
AD-A127702 ..... N83-32400 #
AD-A127703 ..... N83-32465 #
AD-A127704 ..... N83-32415 #
AD-A127705 ..... N83-32470 #
AD-A127706 ..... N83-32261 #
AD-A127707 ..... N83-32000 #
AD-A127708 ..... N83-31936 #
AD-A127709 ..... N83-31605 #
AD-A127710 ..... N83-32583 #
AD-A127715 ..... N83-32308 #
AD-A127717 ..... N83-32053 #
AD-A127718 ..... N83-32380 #
AD-A127720 ..... N83-31865 #
AD-A127721 ..... N83-31864 #
AD-A127724 ..... N83-32585 #
AD-A127726 ..... N83-32427 #
AD-A127727 ..... N83-32426 #
AD-A127728 ..... N83-32425 #
AD-A127729 ..... N83-32424 #
AD-A127732 ..... N83-32103 #
AD-A127738 ..... N83-31935 #
AD-A127739 ..... N83-32401 #
AD-A127741 ..... N83-31943 #
AD-A127744 ..... N83-31606 #
AD-A127751 ..... N83-32006 #
AD-A127756 ..... N83-32519 #
AD-A127757 ..... N83-32446 #
AD-A127758 ..... N83-32445 #
AD-A127759 ..... N83-32447 #
AD-A127760 ..... N83-32473 #
AD-A127761 ..... N83-32444 #
AD-A127762 ..... N83-32443 #
AD-A127763 ..... N83-32442 #
AD-A127764 ..... N83-32402 #
AD-A127765 ..... N83-31755 #
AD-A127775 ..... N83-32030 #
AD-A127776 ..... N83-32568 #
AD-A127781 ..... N83-32007 #
AD-A127782 ..... N83-32472 #
AD-A127783 ..... N83-32471 #
AD-A127786 ..... N83-32061 #
AD-A127805 ..... N83-32448 #
AD-A127809 ..... N83-31970 #
AD-A127810 ..... N83-31969 #
AD-A127812 ..... N83-31756 #
AD-A127813 ..... N83-32529* #
AD-A127814 ..... N83-32403 #
AD-A127815 ..... N83-32474 #
AD-A127816 ..... N83-32263 #
AD-A127817 ..... N83-31974 #
AD-A127820 ..... N83-32109 #
AD-A127821 ..... N83-32262 #
AD-A127822 ..... N83-32620 #
AD-A127824 ..... N83-31870 #
AD-A127825 ..... N83-32528 #
AD-A127826 ..... N83-31572 #
AD-A127827 ..... N83-32071 #

AD-A127828 ..... N83-31592 #
AD-A127830 ..... N83-32477 #
AD-A127839 ..... N83-32055 #
AD-A127841 ..... N83-32029 #
AD-A127853 ..... N83-32699 #
AD-A127854 ..... N83-32300 #
AD-A127855 ..... N83-32299 #
AD-A127856 ..... N83-32374 #
AD-A127857 ..... N83-32375 #
AD-A127859 ..... N83-32049 #
AD-A127863 ..... N83-31861 #
AD-A127865 ..... N83-32027* #
AD-A127866 ..... N83-32210 #
AD-A127868 ..... N83-32416 #
AD-A127870 ..... N83-31964 #
AD-A127872 ..... N83-32259 #
AD-A127873 ..... N83-31933 #
AD-A127874 ..... N83-31747 #
AD-A127875 ..... N83-32346 #
AD-A127881 ..... N83-32417 #
AD-A127882 ..... N83-31587 #
AD-A127883 ..... N83-32410 #
AD-A127884 ..... N83-32298 #
AD-A127892 ..... N83-31735 #
AD-A127893 ..... N83-32616 #
AD-A127895 ..... N83-32209 #
AD-A127899 ..... N83-31932 #
AD-A127900 ..... N83-32373 #
AD-A127901 ..... N83-32411 #
AD-A127902 ..... N83-32101 #
AD-A127916 ..... N83-31746 #
AD-A127918 ..... N83-32476 #
AD-A127920 ..... N83-32462 #
AD-A127924 ..... N83-32463 #
AD-A127927 ..... N83-31899 #
AD-A127928 ..... N83-31900 #
AD-A127929 ..... N83-31901 #
AD-A127930 ..... N83-31902 #
AD-A127939 ..... N83-32412 #
AD-A127940 ..... N83-32413 #
AD-A127941 ..... N83-32414 #
AD-A127942 ..... N83-32464 #
AD-A127944 ..... N83-32002 #
AD-A127945 ..... N83-31758 #
AD-A127946 ..... N83-32589 #
AD-A127947 ..... N83-32525 #
AD-A127948 ..... N83-32433 #
AD-A127949 ..... N83-32297 #
AD-A127950 ..... N83-31582 #
AD-A127951 ..... N83-32596 #
AD-A127953 ..... N83-31941 #
AD-A127954 ..... N83-31887 #
AD-A127955 ..... N83-32432 #
AD-A127957 ..... N83-31736 #
AD-A127969 ..... N83-31752 #
AD-A127971 ..... N83-32077 #
AD-A127972 ..... N83-32381 #
AD-A127984 ..... N83-31968 #
AD-A127985 ..... N83-31967 #
AD-A127987 ..... N83-31588 #
AD-A127989 ..... N83-32239 #
AD-A127990 ..... N83-31940 #
AD-A127991 ..... N83-32106 #
AD-A127993 ..... N83-31939 #
AD-A127995 ..... N83-32663 #
AD-A127997 ..... N83-31973 #
AD-A128004 ..... N83-32003 #
AD-A128005 ..... N83-32216 #
AD-A128006 ..... N83-31868 #
AD-A128008 ..... N83-31972 #
AD-A128015 ..... N83-31589 #
AD-A128016 ..... N83-32107 #
AD-A128019 ..... N83-31971 #
AD-A128020 ..... N83-32436 #
AD-A128021 ..... N83-32296 #
AD-A128027 ..... N83-32435 #
AD-A128028 ..... N83-32383 #
AD-A128031 ..... N83-32586 #
AD-A128032 ..... N83-32215 #
AD-A128033 ..... N83-32058 #
AD-A128037 ..... N83-32057 #
AD-A128040 ..... N83-32056 #
AD-A128041 ..... N83-31584 #
AD-A128042 ..... N83-31706 #
AD-A128046 ..... N83-32701 #
AD-A128048 ..... N83-31825 #
AD-A128049 ..... N83-32428 #
AD-A128067 ..... N83-32295 #
AD-A128154 ..... N83-32294 #
AD-A128158 ..... N83-32082 #
AD-A128196 ..... N83-31930 #
AD-A128205 ..... N83-32268 #
AD-A128208 ..... N83-32267 #
AD-A128233 ..... N83-32688 #
AD-A128235 ..... N83-32387 #
AD-A128239 ..... N83-32527 #
AD-A128241 ..... N83-31720 #
AD-A128242 ..... N83-32526 #
AD-A128243 ..... N83-32441 #
AD-A128248 ..... N83-31571 #
AD-A128251 ..... N83-32386 #
AD-A128254 ..... N83-32060 #
AD-A128255 ..... N83-31754 #
AD-A128259 ..... N83-32385 #
AD-A128260 ..... N83-32440 #
AD-A128261 ..... N83-32439 #
AD-A128263 ..... N83-31599 #
AD-A128265 ..... N83-31942 #
AD-A128282 ..... N83-32004 #
AD-A128283 ..... N83-32587 #
AD-A128287 ..... N83-32108 #
AD-A128289 ..... N83-32005 #
AD-A128301 ..... N83-32384 #
AD-A128304 ..... N83-32217 #
AD-A128305 ..... N83-32218 #
AD-A128309 ..... N83-31869 #
AD-A128317 ..... N83-32059 #
AD-A128319 ..... N83-32240 #
AD-A128323 ..... N83-31614 #
AD-A128331 ..... N83-31608 #
AD-A128333 ..... N83-32619 #
AD-A128339 ..... N83-32006 #
AD-A128343 ..... N83-32266 #
AD-A128347 ..... N83-32437 #
AD-A128355 ..... N83-32664 #
AD-A128356 ..... N83-32665 #
AD-A128359 ..... N83-32438 #
AD-A128497 ..... N83-32450 #
AD-A128498 ..... N83-32078 #
AD-A128501 ..... N83-31948 #
AD-A128507 ..... N83-32520 #
AD-A128509 ..... N83-32449 #
AD-A128510 ..... N83-32032 #
AD-A128511 ..... N83-32241 #
AD-A128515 ..... N83-32293 #
AD-A128521 ..... N83-32666 #
AD-A128522 ..... N83-32667 #
AD-A128527 ..... N83-31585 #
AD-A128529 ..... N83-32309 #
AD-A128530 ..... N83-31615 #
AD-A128532 ..... N83-31601 #
AD-A128533 ..... N83-32509 #
AD-A128534 ..... N83-32062 #
AD-A128536 ..... N83-32475 #
AD-A128545 ..... N83-31947 #
AD-A128546 ..... N83-31946 #
AD-A128548 ..... N83-31574 #
AD-A128549 ..... N83-31740 #
AD-A128551 ..... N83-32265 #
AD-A128553 ..... N83-32009 #
AD-A128554 ..... N83-31945 #
AD-A128556 ..... N83-32110 #
AD-A128557 ..... N83-31888 #
AD-A128558 ..... N83-32031 #
AD-A128559 ..... N83-31944 #
AD-A128566 ..... N83-31757 #
AD-A128568 ..... N83-32264 #
AD-A128569 ..... N83-31739 #
AD-A128576 ..... N83-32154 #
AD-A128578 ..... N83-32269 #
AD-A128579 ..... N83-31609 #
AD-A128582 ..... N83-32183 #
AD-A128584 ..... N83-31573 #
AD-A128587 ..... N83-31975 #
AD-A128590 ..... N83-31600 #
AD-A128599 ..... N83-31871 #
AD-A128601 ..... N83-32703 #
AD-A128602 ..... N83-32646 #
AD-A128638 ..... N83-32311 #
AD-A128645 ..... N83-32310 #
AD-E001412 ..... N83-32581 #
AD-E001425 ..... N83-32056 #
AD-E500581 ..... N83-32587 #
AD-F300234 ..... N83-32108 #
AD-F300238 ..... N83-31584 #
AD-F300241 ..... N83-32057 #
AD-F300242 ..... N83-31706 #
AEDC-TR-83-3 ..... N83-31998 #
AFESC/ESL-TR-82-49 ..... N83-31754 #
AFGL-AFSG-440 ..... N83-32237 #
AFGL-ERP-807 ..... N83-32213 #
AFGL-ERP-812 ..... N83-32238 #
AFGL-IP-314 ..... N83-31583 #
AFGL-TR-82-0294-APP-B ..... N83-32699 #
AFGL-TR-82-0350 ..... N83-31583 #
AFGL-TR-82-0351 ..... N83-32237 #
AFGL-TR-82-0354 ..... N83-32213 #
AFGL-TR-82-0369 ..... N83-32209 #
AFGL-TR-82-0382 ..... N83-32238 #
AFGL-TR-83-0024 ..... N83-32697 #
AFGL-TR-83-0029 ..... N83-32701 #
AFHRL-TR-74-97(2) ..... N83-32662 #
AFIT-CI-NR-83-7D ..... N83-31613 #
AFIT-CI-NR-83-11T ..... N83-31734 #
AFIT-CI-NR-83-12T ..... N83-31609 #
AFIT-NR-82-83T ..... N83-32183 #
AFIT/GCS/EE/83M-4 ..... N83-32673 #
AFIT/GE/EE/81D-47 ..... N83-31607 #
AFIT/GEP/PH/82D-4 ..... N83-32694 #
AFIT/GEP/PH/82D-13 ..... N83-31938 #
AFIT/GEP/PH/82D-24 ..... N83-32345 #
AFIT/GEP/PH/82D-26 ..... N83-32375 #
AFIT/GEP/PH/82D-28 ..... N83-32054 #
AFIT/LSSR-86-82 ..... N83-31573 #
AFOR-83-0330TR ..... N83-32374 #
AFOSR-82-0052TR ..... N83-32206 #
AFOSR-83-0197TR ..... N83-32698 #
AFOSR-83-0216TR-PT-1/2 ..... N83-32615 #
AFOSR-83-0221TR ..... N83-31721 #
AFOSR-83-0230TR ..... N83-31999 #
AFOSR-83-0231TR ..... N83-31581 #
AFOSR-83-0232TR ..... N83-31580 #
AFOSR-83-0234TR ..... N83-32524 #
AFOSR-83-0236TR ..... N83-31927 #
AFOSR-83-0237TR ..... N83-32208 #
AFOSR-83-0238TR ..... N83-32220 #
AFOSR-83-0239TR ..... N83-32046 #
AFOSR-83-0241TR ..... N83-31725 #
AFOSR-83-0247TR ..... N83-32048 #
AFOSR-83-0249TR ..... N83-32579 #
AFOSR-83-0262TR ..... N83-31963 #
AFOSR-83-0263TR ..... N83-31745 #
AFOSR-83-0264TR ..... N83-32691 #
AFOSR-83-0269TR ..... N83-31737 #
AFOSR-83-0272TR ..... N83-32001 #
AFOSR-83-0274TR ..... N83-32105 #
AFOSR-83-0275TR ..... N83-32211 #
AFOSR-83-0277TR ..... N83-31862 #
AFOSR-83-0279TR ..... N83-31750 #
AFOSR-83-0280TR ..... N83-32051 #
AFOSR-83-0281TR ..... N83-32214 #
AFOSR-83-0285TR ..... N83-32419 #
AFOSR-83-0294TR ..... N83-32431 #
AFOSR-83-0295TR ..... N83-32430 #
AFOSR-83-0297TR ..... N83-32469 #
AFOSR-83-0301TR ..... N83-32409 #
AFOSR-83-0302TR ..... N83-32429 #
AFOSR-83-0318TR ..... N83-32463 #
AFOSR-83-0326TR ..... N83-32474 #
AFOSR-83-0328TR ..... N83-32403 #
AFOSR-83-0331TR ..... N83-32583 #
AFOSR-83-0334TR ..... N83-32401 #
AFOSR-83-0335TR ..... N83-32373 #
AFOSR-83-0336TR ..... N83-31932 #
AFOSR-83-0337TR ..... N83-32402 #
AFOSR-83-0339TR ..... N83-32433 #
AFOSR-83-0341TR ..... N83-32008 #
AFOSR-83-0342TR ..... N83-32471 #
AFOSR-83-0343TR ..... N83-32411 #
AFOSR-83-0344TR ..... N83-32002 #
AFOSR-83-0345TR ..... N83-32525 #
AFOSR-83-0346TR ..... N83-32061 #
AFOSR-83-0347TR ..... N83-31755 #
AFOSR-83-0351TR ..... N83-31756 #
AFOSR-83-0352TR ..... N83-31758 #
AFOSR-83-0353TR ..... N83-32101 #
AFOSR-83-0354TR ..... N83-31605 #
AFOSR-83-0359TR ..... N83-32529* #
AFOSR-83-0371TR ..... N83-32297 #
AFOSR-83-0415TR ..... N83-32438 #
AFOSR-83-0417TR ..... N83-32475 #
AFOSR-83-0419TR ..... N83-31948 #
AFOSR-83-0420TR ..... N83-32449 #
AFOSR-83-0428TR ..... N83-32509 #
AFOSR-83-0429TR ..... N83-32062 #
AFOSR-8300329TR ..... N83-32435 #
AFRPL-TR-82-031 ..... N83-32661 #
AFRPL-TR-83-002 ..... N83-31866 #
AFWA-TR-81-3124 ..... N83-32106 #

AFWAL-TR-81-2127-VOL-1 ..... N83-31997 #
AFWAL-TR-82-2121-VOL-1 ..... N83-31606 #
AFWAL-TR-82-2121-VOL-2 ..... N83-31738 #
AFWAL-TR-82-3018 ..... N83-31582 #
AFWAL-TR-82-3022 ..... N83-32450 #
AFWAL-TR-82-3047 ..... N83-31569 #
AFWAL-TR-82-3048 ..... N83-32107 #
AFWAL-TR-82-3088-VOL-1 ..... N83-32408 #
AFWAL-TR-82-3088-VOL-2 ..... N83-32387 #
AFWAL-TR-82-4178 ..... N83-31735 #
AFWAL-TR-82-4182 ..... N83-31739 #

AFWL-TR-82-82 ..... N83-31974 #
AFWL-TR-82-137 ..... N83-32030 #
AFWL-TR-82-145 ..... N83-32097 #

AGARD-CAL-83/1 ..... N83-32706 #

AI-M-697 ..... N83-32580 #
AI-M-700 ..... N83-32313 #
AI-M-701 ..... N83-32399 #

AI/DS-1027-1 ..... N83-32583 #

AIRESEARCH-82-19211 ..... N83-32687* #

AMI-011 ..... N83-32616 #

AMMRC-TR-83-3 ..... N83-32620 #
AMMRC-TR-83-4 ..... N83-32109 #

AMRC-R-422 ..... N83-32523 #

ANL-82-14 ..... N83-31836 #
ANL-83-7 ..... N83-32010 #

ANL/FPP/TM-166 ..... N83-31872 #

ANL/NDM-70 ..... N83-32537 #

APR-1 ..... N83-31962 #

AR-2 ..... N83-32101 #
AR-11 ..... N83-32120 #
AR-003-059 ..... N83-31888 #

ARAP-TM-83-3 ..... N83-32263 #

ARBRL-MR-03265 ..... N83-32057 #

ARBRL-SP-00028 ..... N83-31706 #

ARBRL-TR-02484 ..... N83-32108 #
ARBRL-TR-02485 ..... N83-31584 #

ARCSL-TR-82068 ..... N83-31871 #

ARL/AERO-TM-344 ..... N83-31585 #
ARL/AERO-TM-347 ..... N83-32031 #

ARL/MECH/ENG-160 ..... N83-31599 #

ARL/PSU/TM-82-204 ..... N83-32589 #
ARL/PSU/TM-82-230 ..... N83-32104 #

ARLCB-TR-83005 ..... N83-32099 #

ARO-15199.7-PH ..... N83-32382 #
ARO-15529.10-GS ..... N83-32236 #
ARO-15916.2-MS ..... N83-31819 #
ARO-16221.7-PH ..... N83-32617 #
ARO-16393.3-MS ..... N83-31865 #
ARO-16800.19-PH ..... N83-32584 #
ARO-16861.2-GS ..... N83-32102 #
ARO-16950.9-CH ..... N83-31748 #
ARO-16984.2-EL-A ..... N83-32398 #
ARO-18192.1-MS-A ..... N83-31822 #
ARO-18591.1-EL-H ..... N83-32379 #
ARO-19063.2-EG ..... N83-32098 #
ARO-19065.7-MA ..... N83-32418 #
ARO-20140.1-MA ..... N83-32467 #

ARRAC-83-1 ..... N83-32372 #

ARTEC-13-176 ..... N83-31758 #

ASD-TR-82-5033 ..... N83-32662 #

AS139 ..... N83-32248 #

ATC-R-92000/2CR-20 ..... N83-31826 #

ATR-4 ..... N83-32211 #

AVRADCOM-TR-83-D-21 ..... N83-32518* #

AWRE-O18/82 ..... N83-31920

B-166506 ..... N83-32190 #
B-180224 ..... N83-32656 #
B-194786 ..... N83-32563 #
B-210393 ..... N83-32655 #
B-210595 ..... N83-32350 #
B-210769 ..... N83-31616 #
B-210947 ..... N83-32594 #

BAE-KAD-GEN-N-2868 ..... N83-31994

BAE-KGT-N-GEN-00999 ..... N83-31729

BAE-KRS-N-GEN-243 ..... N83-31594
BAE-KRS-N-GEN-274 ..... N83-31575

BDX-613-2874 ..... N83-31880 #

BIO-1 ..... N83-32286* #

BLL-CE-TRANS-7880-(9022.09) ..... N83-31898 #

BLL-M-26987-(5828.4) ..... N83-31809 #
BLL-M-26991-(5828.4) ..... N83-31801 #
BLL-M-26995-(5828.4) ..... N83-31810 #
BLL-M-28685-(5828.4) ..... N83-31807 #
BLL-M-34936-(5828.4) ..... N83-32085 #
BLL-M-34939-(5828.4) ..... N83-31796 #
BLL-M-34951-(5828.4) ..... N83-31811 #
BLL-M-34952-(5828.4) ..... N83-31804 #
BLL-M-34953-(5828.4) ..... N83-31805 #
BLL-M-34959-(5828.4) ..... N83-31808 #
BLL-M-34969-(5828.4) ..... N83-31814 #
BLL-M-34971-(5828.4) ..... N83-31812 #
BLL-M-34972-(5828.4) ..... N83-31813 #
BLL-M-34974-(5828.4) ..... N83-32076 #
BLL-M-34975-(5828.5) ..... N83-31815 #
BLL-M-34980-(5828.4) ..... N83-31817 #
BLL-M-34981-(5828.4) ..... N83-31816 #
BLL-M-34983-(5828.4) ..... N83-32088 #
BLL-M-34987-(5828.4) ..... N83-32086 #
BLL-M-34988-(5828.4) ..... N83-31803 #
BLL-M-34991-(5828.4) ..... N83-31995 #
BLL-M-34993-(5828.4) ..... N83-31728 #
BLL-M-35006-(5828.4) ..... N83-32087 #
BLL-M-35007-(5828.4) ..... N83-31806 #
BLL-M-35010-(5828.4) ..... N83-31800 #
BLL-M-35028-(5828.4) ..... N83-32613 #
BLL-M-35036-(5828.4) ..... N83-31798 #
BLL-M-35039-(5828.4) ..... N83-31799 #

BLL-OA-TRANS-3018-(6196.3) ..... N83-31797 #

BLL-RISLEY-TR-4741-(9091.9F) ..... N83-31802 #

BMFT-FB-T-83-042 ..... N83-31908 #
BMFT-FB-T-83-043 ..... N83-32184 #
BMFT-FB-T-83-048 ..... N83-32644 #
BMFT-FB-T-83-050 ..... N83-31848 #
BMFT-FB-T-83-051 ..... N83-31849 #
BMFT-FB-T-83-053 ..... N83-31882 #
BMFT-FB-T-83-056 ..... N83-32199 #
BMFT-FB-T-83-068 ..... N83-32160 #
BMFT-FB-T-83-081 ..... N83-32074 #

BN-1001-PT-1 ..... N83-32440 #
BN-1002-PT-2 ..... N83-32439 #

BNL-NUREG-51585 ..... N83-32013 #

BNL-30243 ..... N83-31787 #
BNL-30364-R ..... N83-31912 #
BNL-31917 ..... N83-32041 #
BNL-31953 ..... N83-32539 #
BNL-31970 ..... N83-32550 #
BNL-31974 ..... N83-32543 #
BNL-32073 ..... N83-32570 #
BNL-32087 ..... N83-32064 #
BNL-32132 ..... N83-31783 #
BNL-32143 ..... N83-32639 #
BNL-32173 ..... N83-31987 #
BNL-32211 ..... N83-31778 #
BNL-32212 ..... N83-32559 #
BNL-32214 ..... N83-32591 #
BNL-32230 ..... N83-32638 #
BNL-32262 ..... N83-31978 #
BNL-32263 ..... N83-32551 #
BNL-32268 ..... N83-32512 #
BNL-32274 ..... N83-32630 #
BNL-32304 ..... N83-32592 #
BNL-32398 ..... N83-32245 #
BNL-32430 ..... N83-32636 #
BNL-32870 ..... N83-32561 #

BR87846 ..... N83-31920

BR88714 ..... N83-32287 #

CAL-1511 ..... N83-32691 #

CALSPAN-7031-M-1 ..... N83-32581 #

CCS-RR-454 ..... N83-32462 #
CCS-RR-456 ..... N83-32476 #

CECOM-82-CJ231 ..... N83-31965 #

CERC-MR-83-1 ..... N83-32259 #

CERC-TP-83-1 ..... N83-32416 #

CERL-MR-83-6 ..... N83-32265 #

CERL-TR-E-184 ..... N83-31964 #

CERL-TR-M-326 ..... N83-31820 #

CERN-EP-82-133 ..... N83-32536 #

CETS-CEER-001A ..... N83-32228 #
CETS-CEER-001B ..... N83-32229 #

CFD/82/7 ..... N83-32023 #

CGR/DC-24/82 ..... N83-31586 #

CMI-813403-1 ..... N83-31790 #
CMI-813403-3 ..... N83-31791 #
CMI-813403-4 ..... N83-32025 #
CMI-821151-3 ..... N83-32275 #
CMI-821156-1 ..... N83-32253 #
CMI-821156-1 ..... N83-32254 #
CMI-823350-3 ..... N83-31792 #

CMU-CS-83-103 ..... N83-32434 #
CMU-CS-83-104 ..... N83-31934 #
CMU-CS-83-108 ..... N83-32376 #

CONF-82031-12 ..... N83-32283 #
CONF-811035-6 ..... N83-32194 #
CONF-811184-3 ..... N83-32111 #
CONF-820266-1 ..... N83-31906 #
CONF-820269-1 ..... N83-31727 #
CONF-820322-3 ..... N83-32391 #
CONF-820397-1 ..... N83-31772 #
CONF-820470-3 ..... N83-32553 #
CONF-820496-1 ..... N83-32606 #
CONF-820511-2-REV-1 ..... N83-31949 #
CONF-820545-3 ..... N83-32641 #
CONF-820655-11 ..... N83-32532 #
CONF-820706-3 ..... N83-32018 #
CONF-820718-15 ..... N83-32539 #
CONF-820718-17 ..... N83-32538 #
CONF-820718-22 ..... N83-32639 #
CONF-820743-2 ..... N83-32626 #
CONF-820747-2 ..... N83-32566 #
CONF-820760-1 ..... N83-32629 #
CONF-820763-1 ..... N83-32456 #
CONF-820764-2 ..... N83-31778 #
CONF-820773-1 ..... N83-31759 #
CONF-820820-4 ..... N83-32116 #
CONF-820820-5 ..... N83-31985 #
CONF-820820-6 ..... N83-32080 #
CONF-820820-9 ..... N83-31741 #
CONF-820829-7 ..... N83-32033 #
CONF-820839-5 ..... N83-32550 #
CONF-820839-6 ..... N83-32592 #
CONF-820864-4 ..... N83-32622 #
CONF-820891-1 ..... N83-31860 #
CONF-820891-3 ..... N83-32627 #
CONF-820898-1 ..... N83-31839 #
CONF-820901-7 ..... N83-32019 #
CONF-820911-2 ..... N83-32571 #
CONF-820929-12 ..... N83-32621 #
CONF-820929-13 ..... N83-32623 #
CONF-820940-7 ..... N83-32015 #
CONF-820941-10 ..... N83-32638 #
CONF-820977 ..... N83-31765 #
CONF-820979-5 ..... N83-32556 #
CONF-820980-1 ..... N83-32542 #
CONF-820982-1 ..... N83-31828 #
CONF-820988-1 ..... N83-32511 #
CONF-820988-3 ..... N83-32064 #
CONF-820991-1 ..... N83-32552 #
CONF-821011-15 ..... N83-32034 #
CONF-821011-16 ..... N83-32530 #
CONF-821011-17 ..... N83-32590 #
CONF-821011-18 ..... N83-32348 #
CONF-821011-20 ..... N83-31951 #
CONF-821011-22 ..... N83-31978 #
CONF-821011-23 ..... N83-32570 #
CONF-821011-25 ..... N83-32591 #

CONF-821011-26 ..... N83-31987 #
CONF-821011-29 ..... N83-31782 #
CONF-821011-32 ..... N83-31981 #
CONF-821011-33 ..... N83-32065 #
CONF-821011-34 ..... N83-31982 #
CONF-821011-41 ..... N83-32037 #
CONF-821028-2 ..... N83-31907 #
CONF-821035-5 ..... N83-32073 #
CONF-821035-6 ..... N83-31771 #
CONF-821035-9 ..... N83-31767 #
CONF-821045-2-DRAFT ..... N83-32601 #
CONF-821049-5 ..... N83-31831 #
CONF-821049-7 ..... N83-31840 #
CONF-821049-9 ..... N83-31844 #
CONF-821057-1 ..... N83-32041 #
CONF-821065-1 ..... N83-32637 #
CONF-821073-1 ..... N83-32544 #
CONF-821089-5 ..... N83-32608 #
CONF-821090-1 ..... N83-32568 #
CONF-821101-15 ..... N83-32112 #
CONF-821101-16 ..... N83-32022 #
CONF-821103-50 ..... N83-32020 #
CONF-821103-52 ..... N83-32559 #
CONF-821106-10 ..... N83-32513 #
CONF-821106-11-REV ..... N83-32014 #
CONF-821106-14 ..... N83-32011 #
CONF-821106-21 ..... N83-32645 #
CONF-821106-22 ..... N83-31783 #
CONF-821107-5 ..... N83-32564 #
CONF-821107-36 ..... N83-32455 #
CONF-821107-39 ..... N83-32632 #
CONF-821108-8 ..... N83-31986 #
CONF-821108-9 ..... N83-32512 #
CONF-821108-10 ..... N83-32630 #
CONF-821109-2 ..... N83-31834 #
CONF-821111-11 ..... N83-32625 #
CONF-821111-16 ..... N83-31990 #
CONF-821119-5 ..... N83-32039 #
CONF-821119-8 ..... N83-32038 #
CONF-821121-1 ..... N83-32197 #
CONF-821121-2 ..... N83-31905 #
CONF-821122-6 ..... N83-32068 #
CONF-821123-28 ..... N83-32545 #
CONF-821124-6 ..... N83-32604 #
CONF-821124-13 ..... N83-32607 #
CONF-821133-3 ..... N83-31742 #
CONF-821136-1 ..... N83-32242 #
CONF-821136-5 ..... N83-32195 #
CONF-821136-6 ..... N83-32244 #
CONF-821136-12 ..... N83-32247 #
CONF-821136-16 ..... N83-32245 #
CONF-821146-1 ..... N83-32036 #
CONF-821147-1 ..... N83-32628 #
CONF-821176-1 ..... N83-31760 #
CONF-821202-3 ..... N83-32390 #
CONF-821204-1 ..... N83-32224 #
CONF-821205-5 ..... N83-32569 #
CONF-821206-1 ..... N83-31950 #
CONF-821207-1 ..... N83-31977 #
CONF-821213-2 ..... N83-31891 #
CONF-821213-3 ..... N83-32021 #
CONF-821219 ..... N83-32640 #
CONF-821219-2 ..... N83-32634 #
CONF-821223-2 ..... N83-31838 #
CONF-830102-1 ..... N83-32017 #
CONF-830102-3 ..... N83-31904 #
CONF-830103-16 ..... N83-31761 #
CONF-830106-1 ..... N83-32452 #
CONF-830107-1 ..... N83-31989 #
CONF-830109-1 ..... N83-32540 #
CONF-830111-1 ..... N83-31877 #
CONF-830113-1 ..... N83-31988 #
CONF-830203-2 ..... N83-31593 #
CONF-830204-2 ..... N83-32531 #
CONF-830224-8 ..... N83-32561 #
CONF-830307-3 ..... N83-32198 #
CONF-830307-4 ..... N83-32454 #
CONF-830307-5 ..... N83-32453 #
CONF-830308-3 ..... N83-31769 #
CONF-830311-9 ..... N83-31976 #
CONF-830406-23 ..... N83-32609 #
CONF-8105105-5 ..... N83-31787 #
CONF-8205114-2 ..... N83-31821 #
CONF-8205139-1 ..... N83-31841 #
CONF-8206116-7 ..... N83-32593 #
CONF-8206116-16 ..... N83-32551 #
CONF-8206123-1 ..... N83-32543 #
CONF-8206125-1 ..... N83-32541 #
CONF-8206127-1 ..... N83-31774 #
CONF-8206127-2 ..... N83-31773 #
CONF-8206136-3 ..... N83-32555 #
CONF-8210103-1 ..... N83-31776 #
CONF-8210108-1 ..... N83-32556 #
CONF-8210114-1 ..... N83-32558 #
CONF-8305121-3 ..... N83-32603 #

COO-1195-476 ..... N83-32389 #
COO-2218-262 ..... N83-32607 #

CRREL-83-6 ..... N83-32262 #

CSC/SD-82/6125-REV ..... N83-32370* #
CSC/SD-83/6012-REV ..... N83-32369* #

CSC/TM-83/6019 ..... N83-32355* #

CSDL-R-1599-VOL-1 ..... N83-31899 #
CSDL-R-1599-VOL-2 ..... N83-31900 #
CSDL-R-1599-VOL-3 ..... N83-31901 #
CSDL-R-1599-VOL-4 ..... N83-31902 #

CSIR-CENG-421 ..... N83-31794 #

CUER/D-SOILS-TR-124-1982 ..... N83-31917 #

CUNY-MB2-TR-82-02-AFOSR ..... N83-32463 #

CWRU/BIOM-82/01 ..... N83-32674 #

DDI/TR-83-4-314.73 ..... N83-31935 #

DE82-014076 ..... N83-32641 #
DE82-014675 ..... N83-31890 #
DE82-015768 ..... N83-31787 #
DE82-017387 ..... N83-32457 #
DE82-019111 ..... N83-32224 #
DE82-022169 ..... N83-32452 #
DE83-04414 ..... N83-31982 #
DE83-04971 ..... N83-31879 #
DE83-000082 ..... N83-31951 #
DE83-000090 ..... N83-32564 #
DE83-000091 ..... N83-32569 #
DE83-000313 ..... N83-32626 #
DE83-000353 ..... N83-32540 #
DE83-000362 ..... N83-31860 #
DE83-000495 ..... N83-32197 #
DE83-000518 ..... N83-32541 #
DE83-000603 ..... N83-31773 #
DE83-000612 ..... N83-32637 #
DE83-000637 ..... N83-32080 #
DE83-000642 ..... N83-31772 #
DE83-000647 ..... N83-31985 #
DE83-000649 ..... N83-32603 #
DE83-000666 ..... N83-32039 #
DE83-000671 ..... N83-32116 #
DE83-000672 ..... N83-32390 #
DE83-000686 ..... N83-32549 #
DE83-000721 ..... N83-31989 #
DE83-000896 ..... N83-32155 #
DE83-000918 ..... N83-32548 #
DE83-000978 ..... N83-32041 #
DE83-001157 ..... N83-32111 #
DE83-001214 ..... N85-32156 #
DE83-001217 ..... N83-32157 #
DE83-001267 ..... N83-31977 #
DE83-001306 ..... N83-32543 #
DE83-001387 ..... N83-31984 #
DE83-001417 ..... N83-31906 #
DE83-001539 ..... N83-31741 #
DE83-001552 ..... N83-32073 #
DE83-001554 ..... N83-32018 #
DE83-001563 ..... N83-32513 #
DE83-001564 ..... N83-32014 #
DE83-001568 ..... N83-31765 #
DE83-001624 ..... N83-31828 #
DE83-001694 ..... N83-31889 #
DE83-001856 ..... N83-32219 #
DE83-001864 ..... N83-31786 #
DE83-001916 ..... N83-32575 #
DE83-001960 ..... N83-32544 #
DE83-001979 ..... N83-32038 #
DE83-002013 ..... N83-32532 #
DE83-002061 ..... N83-32571 #
DE83-002077 ..... N83-31774 #
DE83-002099 ..... N83-32547 #
DE83-002143 ..... N83-32625 #
DE83-002165 ..... N83-31980 #
DE83-002185 ..... N83-32568 #
DE83-002188 ..... N83-32034 #
DE83-002214 ..... N83-31829 #
DE83-002221 ..... N83-32550 #
DE83-002228 ..... N83-31727 #
DE83-002279 ..... N83-32348 #
DE83-002285 ..... N83-32537 #
DE83-002288 ..... N83-32602 #
DE83-002324 ..... N83-32539 #
DE83-002340 ..... N83-32600 #
DE83-002345 ..... N83-31836 #
DE83-002451 ..... N83-32538 #
DE83-002458 ..... N83-32573 #
DE83-002468 ..... N83-31877 #
DE83-002504 ..... N83-32572 #

DE83-002506 ..... N83-32221 #
DE83-002534 ..... N83-31775 #
DE83-002561 ..... N83-32629 #
DE83-002566 ..... N83-32542 #
DE83-002572 ..... N83-32015 #
DE83-002573 ..... N83-31771 #
DE83-002575 ..... N83-32576 #
DE83-002606 ..... N83-31834 #
DE83-002618 ..... N83-32225 #
DE83-002622 ..... N83-31839 #
DE83-002623 ..... N83-31835 #
DE83-002675 ..... N83-31778 #
DE83-002694 ..... N83-32668 #
DE83-002716 ..... N83-31830 #
DE83-002735 ..... N83-32284 #
DE83-002814 ..... N83-32566 #
DE83-002817 ..... N83-32570 #
DE83-002827 ..... N83-32639 #
DE83-002840 ..... N83-32064 #
DE83-003007 ..... N83-32037 #
DE83-003008 ..... N83-31742 #
DE83-003051 ..... N83-32590 #
DE83-003101 ..... N83-31907 #
DE83-003105 ..... N83-32567 #
DE83-003205 ..... N83-31767 #
DE83-003253 ..... N83-32530 #
DE83-003279 ..... N83-32593 #
DE83-003367 ..... N83-32068 #
DE83-003374 ..... N83-32242 #
DE83-003382 ..... N83-32016 #
DE83-003395 ..... N83-31764 #
DE83-003443 ..... N83-32011 #
DE83-003467 ..... N83-31831 #
DE83-003479 ..... N83-32454 #
DE83-003480 ..... N83-32022 #
DE83-003486 ..... N83-32112 #
DE83-003490 ..... N83-32453 #
DE83-003533 ..... N83-32604 #
DE83-003536 ..... N83-32608 #
DE83-003538 ..... N83-32036 #
DE83-003542 ..... N83-32020 #
DE83-003544 ..... N83-31840 #
DE83-003557 ..... N83-31986 #
DE83-003565 ..... N83-32545 #
DE83-003567 ..... N83-32628 #
DE83-003570 ..... N83-32198 #
DE83-003590 ..... N83-32511 #
DE83-003597 ..... N83-32195 #
DE83-003658 ..... N83-31784 #
DE83-003662 ..... N83-32627 #
DE83-003699 ..... N83-31979 #
DE83-003714 ..... N83-31832 #
DE83-003715 ..... N83-31833 #
DE83-003726 ..... N83-32040 #
DE83-003754 ..... N83-32521 #
DE83-003779 ..... N83-32351 #
DE83-003791 ..... N83-32119 #
DE83-003792 ..... N83-31841 #
DE83-003793 ..... N83-31821 #
DE83-003915 ..... N83-32640 #
DE83-003917 ..... N83-32634 #
DE83-003938 ..... N83-32559 #
DE83-003944 ..... N83-31978 #
DE83-003945 ..... N83-32551 #
DE83-003955 ..... N83-32638 #
DE83-003965 ..... N83-31783 #
DE83-004012 ..... N83-31593 #
DE83-004015 ..... N83-31769 #
DE83-004061 ..... N83-31988 #
DE83-004117 ..... N83-31782 #
DE83-004176 ..... N83-31777 #
DE83-004179 ..... N83-32510 #
DE83-004180 ..... N83-32633 #
DE83-004181 ..... N83-32632 #
DE83-004182 ..... N83-32455 #
DE83-004188 ..... N83-32283 #
DE83-004190 ..... N83-32556 #
DE83-004193 ..... N83-31981 #
DE83-004241 ..... N83-32554 #
DE83-004256 ..... N83-32158 #
DE83-004295 ..... N83-32645 #
DE83-004302 ..... N83-32558 #
DE83-004342 ..... N83-32552 #
DE83-004391 ..... N83-32555 #
DE83-004416 ..... N83-32065 #
DE83-004424 ..... N83-32456 #
DE83-004472 ..... N83-32574 #
DE83-004511 ..... N83-31768 #
DE83-004572 ..... N83-32159 #
DE83-004578 ..... N83-32196 #
DE83-004589 ..... N83-32591 #
DE83-004592 ..... N83-32512 #
DE83-004599 ..... N83-32592 #
DE83-004602 ..... N83-31778 #
DE83-004616 ..... N83-32021 #
DE83-004634 ..... N83-31987 #

DE83-004644 N83-31891 #
DE83-004646 N83-32244 #
DE83-004648 N83-31838 #
DE83-004786 N83-31846 #
DE83-004787 N83-31847 #
DE83-004788 N83-32635 #
DE83-004795 N83-31878 #
DE83-004810 N83-32704 #
DE83-004856 N83-31779 #
DE83-004866 N83-32643 #
DE83-004921 N83-31844 #
DE83-004929 N83-32553 #
DE83-004941 N83-31880 #
DE83-004958 N83-31842 #
DE83-004963 N83-31780 #
DE83-004964 N83-31845 #
DE83-004966 N83-32100 #
DE83-004969 N83-31837 #
DE83-004975 N83-31785 #
DE83-004976 N83-31843 #
DE83-004981 N83-31788 #
DE83-004992 N83-31781 #
DE83-005004 N83-32557 #
DE83-005019 N83-31770 #
DE83-005021 N83-31881 #
DE83-005049 N83-32605 #
DE83-005066 N83-32642 #
DE83-005071 N83-32607 #
DE83-005139 N83-32243 #
DE83-005148 N83-32630 #
DE83-005236 N83-32117 #
DE83-005250 N83-32560 #
DE83-005292 N83-32194 #
DE83-005312 N83-32624 #
DE83-005343 N83-32246 #
DE83-005362 N83-31709 #
DE83-005384 N83-32013 #
DE83-005390 N83-32606 #
DE83-005399 N83-32631 #
DE83-005589 N83-32598 #
DE83-005803 N83-32636 #
DE83-005927 N83-31905 #
DE83-006136 N83-31904 #
DE83-006272 N83-32247 #
DE83-006304 N83-32245 #
DE83-006363 N83-32597 #
DE83-006565 N83-32599 #
DE83-006583 N83-31949 #
DE83-006604 N83-31763 #
DE83-006606 N83-32531 #
DE83-006719 N83-32536 #
DE83-006844 N83-32533 #
DE83-006915 N83-31876 #
DE83-007123 N83-32534 #
DE83-007145 N83-31827 #
DE83-007172 N83-32535 #
DE83-007314 N83-32565 #
DE83-007330 N83-32389 #
DE83-007570 N83-32391 #
DE83-007641 N83-31760 #
DE83-007703 N83-32019 #
DE83-007768 N83-32392 #
DE83-007963 N83-31759 #
DE83-008283 N83-32388 #
DE83-008459 N83-32010 #
DE83-008524 N83-32622 #
DE83-008606 N83-32621 #
DE83-008609 N83-32623 #
DE83-008679 N83-31875 #
DE83-008687 N83-32033 #
DE83-008763 N83-31873 #
DE83-009059 N83-32072 #
DE83-009172 N83-32451 #
DE83-009185 N83-31976 #
DE83-009249 N83-32063 #
DE83-009352 N83-31874 #
DE83-009468 N83-31872 #
DE83-010370 N83-32609 #
DE83-011365 N83-32561 #
DE83-015706 N83-32017 #
DE83-018744 N83-31761 #
DE83-030849 N83-31950 #
DE83-821045 N83-32601 #
DE83-900003 N83-32270 #
DE83-900300 N83-32223 #
DE83-900503 N83-32222 #
DE83-900533 N83-31983 #
DE83-900733 N83-31990 #
DE83-900978 N83-32226 #
DE83-900980 N83-32115 #
DE83-901036 N83-32118 #
DE83-901103 N83-32114 #
DE83-901113 N83-32113 #
DE83-901472 N83-32193 #
DE83-901818 N83-31726 #
DE83-901863 N83-32079 #

DE83-0001932 N83-32546 #
DE83-0002024 N83-31766 #
DE83-0006514 N83-31782 #
DE83002587 N83-32035 #

DOE/AF-92009/2 N83-31890 #

DOE/BC-10033/6 N83-31876 #

DOE/ER-0159 N83-32599 #
DOE/ER-01195-476 N83-32389 #
DOE/ER-01198/1395 N83-32117 #
DOE/ER-01198/1397 N83-32631 #
DOE/ER-01545/325 N83-32552 #
DOE/ER-10556/94 N83-31828 #
DOE/ER-10740/8 N83-32642 #
DOE/ER-10841/5 N83-32456 #
DOE/ER-10915/2 N83-31873 #
DOE/ER-12028/1 N83-32284 #
DOE/ER-40033/32 N83-32538 #
DOE/ER-40048/17-P2 N83-32553 #
DOE/ER-53117/T1 N83-32598 #

DOE/ET-10815/58 N83-32063 #
DOE/ET-11423/T6 N83-32624 #
DOE/ET-52027/6 N83-31827 #

DOE/EV-04267/06 N83-32196 #
DOE/EV-10019/13-VOL-2-PT-13 N83-32188 #
DOE/EV-10019/14-VOL-2-PT-14 N83-32189 #

DOE/FC-10297/T4 N83-31786 #

DOE/MC-19301/1 N83-31763 #

DOE/NASA/0077-81/1 N83-32687* #

DOE/NBB-0023-VOL-2 N83-32668 #

DOE/NE-37253/T2 N83-31768 #

DOE/PC-30118/T4 N83-32219 #

DOE/RA-50156-4 N83-31989 #
DOE/RA-50318/1 N83-31889 #

DOE/R5-10226/2 N83-31984 #

DOT/FAA/CT-82/110 N83-31604 #
DOT/FAA/CT-83/34 N83-32303 #

DOT/FAA/ES-83/1 N83-31591 #

DP-MS-82-21 N83-31844 #

DPST-81-141-25 N83-32156 #
DPST-81-141-27 N83-32157 #

DR-4 N83-31635* #

ECRC/M-1575 N83-31992 #
ECRC/M-1581 N83-32043 #
ECRC/M-1591 N83-31852 #

EECS-TR-83-2 N83-31948 #

EGG-FT-6008 N83-32602 #

EGG-PHYS-5297 N83-32040 #

EGG-2220 N83-31979 #

EMPTD-6-UM-001 N83-31974 #

EPA-460/3-83-003 N83-31892 #
EPA-600/2-83-021 N83-31793 #
EPA-600/2-83-030 N83-32203 #
EPA-600/3-83-011 N83-32252 #

EPFL/LTA-TM-8-82 N83-31605 #

EPRI-CS-2813 N83-32193 #

EPRI-EA-2639-SR N83-31990 #

EPRI-EL-2679 N83-31983 #
EPRI-EL-2874 N83-32079 #

EPRI-NP-2759 N83-32113 #
EPRI-NP-2763 N83-32114 #

ERADCOM/ASL-CR-83-0206-1 N83-32234 #

ERC/M-1592 N83-31913 #

ESA-SP-191 N83-31637 #

ESD-TR-82-170 N83-32053 #
ESD-TR-83-123 N83-31937 #

ESL-714215-4 N83-31931 #

ESN-37-1 N83-32672 #

ETL-0309 N83-32153 #

EW-L3-04413 N83-32133* #
EW-L3-04414 N83-32134* #

EW-U3-04405 N83-32130* #
EW-U3-04406 N83-32129* #
EW-U3-04407 N83-32131* #

E83-10373 N83-32126* #
E83-10373 N83-32128* #
E83-10374 N83-32127* #
E83-10376 N83-32129* #
E83-10377 N83-32130* #
E83-10378 N83-32131* #
E83-10379 N83-32132* #
E83-10380 N83-32133* #
E83-10381 N83-32134* #
E83-10382 N83-32135* #
E83-10383 N83-32136* #
E83-10384 N83-32137* #
E83-10385 N83-32138* #
E83-10386 N83-32139* #
E83-10387 N83-32140* #
E83-10388 N83-32141* #
E83-10389 N83-32142* #
E83-10390 N83-32143* #
E83-10391 N83-32144* #
E83-10395 N83-32145* #
E83-10398 N83-32146* #
E83-10399 N83-32147* #

FAA-AM-83-3 N83-31589 #

FAA-EM-82-28-VOL-2 N83-31592 #

FAI-82/31 N83-31768 #

FCC-4445-2 N83-32619 #

FERMILAB-CONF-82/76-EXP N83-31951 #

FERMILAB-PUB-82-74-EXP N83-32547 #
FERMILAB-PUB-82-79 N83-32548 #
FERMILAB-PUB-82-83-EXP N83-32549 #

FHWA/IP-82/10 N83-31912 #

FHWA/RD-82/052 N83-31911 #

FHWA/TS-82/216 N83-31885 #

FR-1 N83-31819 #
FR-3 N83-32275 #
FR-4 N83-32004 #

FTD-ID(RS)T-0074-83 N83-32077 #
FTD-ID(RS)T-0082-83 N83-31970 #
FTD-ID(RS)T-0104-83 N83-31973 #
FTD-ID(RS)T-1752-82 N83-32055 #
FTD-ID(RS)T-1753-82 N83-32585 #
FTD-ID(RS)T-1795-82 N83-31969 #

FWS/OBS-82/21-VOL-1 N83-32202 #

GAO/AFMD-83-29 N83-32350 #

GAO/GGD-83-35 N83-32656 #
GAO/GGD-83-39 N83-32655 #

GAO/RCED-83-48 N83-32563 #
GAO/RCED-83-98 N83-31616 #
GAO/RCED-83-105 N83-32594 #
GAO/RCED-83-161 N83-32190 #

GCSS-TR-12 N83-32402 #

GEPP-OP-641 N83-31906 #

GJBX-198-82 N83-32157 #
GJBX-212-82 N83-32156 #

GO-61289 N83-31965 #

GPO-12-485 N83-32191 #
GPO-12-921 N83-32686 #
GPO-12-976 N83-32192 #
GPO-14-255 N83-31633 #
GPO-19-560 N83-32684 #

GPO-19-864-PT-1 ..... N83-32685 #
GPO-19-900 ..... N83-32683 #
GPO-96-841 ..... N83-32149 #
GPO-99-819 ..... N83-32343 #

GRI-80/0168 ..... N83-31894 #
GRI-81/0136 ..... N83-31893 #
GRI-82/0028 ..... N83-32230 #

H-REPT-98-73 ..... N83-32684 #
H-REPT-98-81 ..... N83-32683 #
H-REPT-98-94 ..... N83-32685 #
H-REPT-98-135-PT-1 ..... N83-32682 #

HAC-FR-80-70-1135R3 ..... N83-31570 #

HDL-CR-83-004-1 ..... N83-31928 #

HDL-SR-83-2 ..... N83-31740 #

HDL-TR-2007 ..... N83-32588 #

HEDL-TME-81-43 ..... N83-32573 #

HIG-TR-82-6 ..... N83-32266 #

HUD-0002651 ..... N83-32186 #
HUD-0002654 ..... N83-32187 #
HUD-0002697 ..... N83-31864 #
HUD-0002712 ..... N83-31885 #

HUD/PDR-700 ..... N83-32186 #

IAITIC-82-1009 ..... N83-32396 #

ICASE-83-30 ..... N83-32341* #

ICMA-83-52 ..... N83-32096 #

IDA-P-1714 ..... N83-32587 #

IDA/HQ-83-25281 ..... N83-32587 #

IDO-10105 ..... N83-32572 #

INPE-2711-PRE/299 ..... N83-32127* #
INPE-2723-NTE/200 ..... N83-32137* #
INPE-2738-RPE/434 ..... N83-32138* #
INPE-2785-PRE/351 ..... N83-32126* #

IOS-135 ..... N83-32271 #
IOS-136 ..... N83-32227 #
IOS-142 ..... N83-32272 #
IOS-150 ..... N83-32273 #

IPF-82-15 ..... N83-32610 #
IPF-82-16 ..... N83-32611 #
IPF-82-17 ..... N83-32612 #

IS-I-1016 ..... N83-31837 #

IS-M-384 ..... N83-32119 #
IS-M-388 ..... N83-31821 #
IS-M-389 ..... N83-31841 #

IS-T-959 ..... N83-31879 #
IS-T-997 ..... N83-32100 #
IS-T-998 ..... N83-31843 #
IS-T-1000 ..... N83-31845 #
IS-T-1006 ..... N83-31785 #
IS-T-1007 ..... N83-31780 #
IS-T-1012 ..... N83-32557 #
IS-T-1019 ..... N83-31842 #
IS-T-1020 ..... N83-31788 #
IS-T-1027 ..... N83-32643 #
IS-T-1032 ..... N83-32635 #
IS-T-1034 ..... N83-31779 #
IS-T-1035 ..... N83-31878 #
IS-T-1040 ..... N83-31846 #
IS-T-1049 ..... N83-31847 #

ISAS-SP-1 ..... N83-32480 #

ISBN-0-250-40557-1 ..... N83-32179
ISBN-0-7988-2346-1 ..... N83-31794 #
ISBN-0-86999-596-7 ..... N83-31853 #
ISBN-0-902553-23-2 ..... N83-32692 #
ISBN-82-595-3006-6 ..... N83-31851 #
ISBN-82-7224-190-0 ..... N83-32689 #
ISBN-90-6196-241-2 ..... N83-32316 #

ISSN-0143-7143 ..... N83-32517
ISSN-0143-7305 ..... N83-31955
ISSN-0262-3218 ..... N83-31921
ISSN-0262-3218 ..... N83-31922
ISSN-0262-3218 ..... N83-31923

ISSN-0262-5369 ..... N83-32093
ISSN-0262-5369 ..... N83-32405
ISSN-0265-6808 ..... N83-32480 #
ISSN-0309-0108 ..... N83-32692 #
ISSN-0309-3050 ..... N83-32479
ISSN-0309-3069 ..... N83-32094
ISSN-0309-7439 ..... N83-31917 #
ISSN-0340-7608 ..... N83-31848 #
ISSN-0340-7608 ..... N83-31849 #
ISSN-0340-7608 ..... N83-31882 #
ISSN-0340-7608 ..... N83-31908 #
ISSN-0340-7608 ..... N83-32074 #
ISSN-0340-7608 ..... N83-32160 #
ISSN-0340-7608 ..... N83-32184 #
ISSN-0340-7608 ..... N83-32199 #
ISSN-0340-7608 ..... N83-32644 #
ISSN-0373-0956 ..... N83-32329 #

JHU/APL/OQR-82-3 ..... N83-32185 #

JPRS-82713 ..... N83-32647 #
JPRS-83622 ..... N83-32121 #
JPRS-83829 ..... N83-32123 #
JPRS-83994 ..... N83-31617 #

JSC-18877 ..... N83-32133* #
JSC-18878 ..... N83-32134* #

KB-TE-1-1173 ..... N83-31611 #

L-15317A ..... N83-31730* #
L-15535 ..... N83-31577* #
L-15558 ..... N83-31596* #
L-15581 ..... N83-32028* #
L-15598 ..... N83-32518* #
L-15615 ..... N83-32044* #
L-15636 ..... N83-31713* #

LA-UR-82-2578 ..... N83-32540 #
LA-UR-82-2630 ..... N83-32116 #
LA-UR-82-2640 ..... N83-32390 #
LA-UR-82-2649 ..... N83-32039 #
LA-UR-82-2654 ..... N83-32603 #
LA-UR-82-2664 ..... N83-31985 #
LA-UR-82-2676 ..... N83-31772 #
LA-UR-82-2703 ..... N83-32080 #
LA-UR-82-2821 ..... N83-32637 #
LA-UR-82-2832 ..... N83-31773 #
LA-UR-82-2843 ..... N83-32038 #
LA-UR-82-2971 ..... N83-32571 #
LA-UR-82-2993 ..... N83-31774 #
LA-UR-82-3034 ..... N83-32454 #
LA-UR-82-3240 ..... N83-32453 #
LA-UR-82-3267 ..... N83-32545 #
LA-UR-82-3276 ..... N83-32628 #
LA-UR-82-3279 ..... N83-32020 #
LA-UR-82-3284 ..... N83-32036 #
LA-UR-82-3297 ..... N83-32198 #
LA-UR-82-3328 ..... N83-32608 #
LA-UR-82-3380 ..... N83-32604 #
LA-UR-82-3437 ..... N83-31986 #
LA-UR-82-3448 ..... N83-31840 #
LA-UR-82-3596 ..... N83-32704 #

LA-9357-T ..... N83-32457 #
LA-9395-MS ..... N83-32574 #
LA-9550-PR ..... N83-32575 #
LA-9588-MS ..... N83-32534 #

LALP-83-4 ..... N83-32388 #

LBL-13341 ..... N83-32565 #
LBL-13883 ..... N83-32017 #
LBL-14160-REV ..... N83-32014 #
LBL-14399 ..... N83-32510 #
LBL-14414 ..... N83-32590 #
LBL-14456 ..... N83-31981 #
LBL-14464 ..... N83-31782 #
LBL-14506 ..... N83-31839 #
LBL-14556 ..... N83-31765 #
LBL-14718 ..... N83-31766 #
LBL-14719 ..... N83-32546 #
LBL-14746 ..... N83-32513 #
LBL-14747 ..... N83-31835 #
LBL-14748 ..... N83-32072 #
LBL-14752 ..... N83-32633 #
LBL-14774 ..... N83-31764 #
LBL-14819 ..... N83-32541 #
LBL-14887 ..... N83-32197 #
LBL-14905 ..... N83-31727 #
LBL-14916 ..... N83-32632 #
LBL-14942 ..... N83-32018 #
LBL-14947 ..... N83-32015 #
LBL-14965 ..... N83-31771 #
LBL-14967 ..... N83-32511 #
LBL-14972 ..... N83-32629 #

LBL-14980 ..... N83-32556 #
LBL-14987 ..... N83-32073 #
LBL-15006 ..... N83-31834 #
LBL-15019 ..... N83-32542 #
LBL-15045 ..... N83-32593 #
LBL-15085 ..... N83-32627 #
LBL-15110 ..... N83-31833 #
LBL-15111 ..... N83-31832 #
LBL-15156 ..... N83-32645 #
LBL-15182 ..... N83-31905 #
LBL-15193 ..... N83-32283 #
LBL-15220 ..... N83-32455 #
LBL-15244 ..... N83-32554 #

LC-82-71533 ..... N83-32179
LC-82-600554 ..... N83-32202 #
LC-83-061448 ..... N83-32693* #

LEMSCO-16928 ..... N83-32134* #
LEMSCO-18246 ..... N83-32133* #

LG83ER0055 ..... N83-31597* #

LIDS-P-1290 ..... N83-32417 #

LMDC-TR-83-1 ..... N83-32659 #

LMSC-D-812950-VOL-1-PT-2 ..... N83-32118 #
LMSC-D-812950-VOL-4 ..... N83-32115 #

LMSC-D889763 ..... N83-31733* #

LMSC-HREC-PR-D867267 ..... N83-31996* #

M-989-03-07 ..... N83-31711* #

MATH-CENTRE-TRACTS-149 ..... N83-32316 #

MCR-TR-8104-3 ..... N83-31574 #
MCR-TR-8229-1 ..... N83-32667 #

MD82-52-BK/GR ..... N83-32430 #
MD82-76-SW ..... N83-32431 #

MIAS-PUBL-4 ..... N83-32271 #

MINTEK-M66 ..... N83-31853 #

MLM-3032(OP) ..... N83-32068 #
MLM-3039 ..... N83-31874 #

MRC-TSR-2464 ..... N83-32519 #
MRC-TSR-2465 ..... N83-32446 #
MRC-TSR-2466 ..... N83-32442 #
MRC-TSR-2467 ..... N83-32443 #
MRC-TSR-2468 ..... N83-32473 #
MRC-TSR-2469 ..... N83-32444 #
MRC-TSR-2470 ..... N83-32261 #
MRC-TSR-2471 ..... N83-32470 #
MRC-TSR-2472 ..... N83-32420 #
MRC-TSR-2473 ..... N83-32000 #
MRC-TSR-2474 ..... N83-32465 #
MRC-TSR-2475 ..... N83-32413 #
MRC-TSR-2476 ..... N83-32414 #
MRC-TSR-2478 ..... N83-32464 #
MRC-TSR-2479 ..... N83-32427 #
MRC-TSR-2480 ..... N83-32007 #
MRC-TSR-2481 ..... N83-32472 #
MRC-TSR-2482 ..... N83-32425 #
MRC-TSR-2483 ..... N83-32426 #
MRC-TSR-2485 ..... N83-32412 #
MRC-TSR-2488 ..... N83-32421 #
MRC-TSR-2489 ..... N83-32422 #
MRC-TSR-2490 ..... N83-32415 #
MRC-TSR-2491 ..... N83-32447 #
MRC-TSR-2492 ..... N83-32445 #
MRC-TSR-2496 ..... N83-32466 #

MRL-R-870 ..... N83-31888 #

MSNW-C.11.198.01 ..... N83-32061 #

MSSU-EIRS-EE-83-6 ..... N83-32344* #

MTR-82W125-VOL-2 ..... N83-31592 #

MWRRC-124 ..... N83-32174 #

M82-59 ..... N83-31937 #

NACOA-24 ..... N83-32120 #

NADC-82188-40 ..... N83-31929 #
NADC-82253-30 ..... N83-32269 #
NADC-82263-60 ..... N83-32288 #
NADC-82268-60 ..... N83-31589 #

NAE-AN-3 ..... N83-32071 #
NAE-AN-5 ..... N83-31608 #

NAEC-92-169 ..... N83-31752 #

NAMRL-1286 ..... N83-32279 #
NAMRL-1287 ..... N83-32304 #
NAMRL-1288 ..... N83-32290 #
NAMRL-1289 ..... N83-32280 #

NAS 1.12/6:7047 ..... N83-32671*
NAS 1.15:77083 ..... N83-31579* #
NAS 1.15:77249 ..... N83-31956* #
NAS 1.15:77263 ..... N83-32277* #
NAS 1.15:82538 ..... N83-32690* #
NAS 1.15:82540 ..... N83-31712* #
NAS 1.15:84366 ..... N83-32676* #
NAS 1.15:84385 ..... N83-31957* #
NAS 1.15:84386 ..... N83-32397* #
NAS 1.15:84629 ..... N83-31636* #
NAS 1.15:84640 ..... N83-32028* #
NAS 1.15:84664 ..... N83-32518* #
NAS 1.15:85023 ..... N83-32695* #
NAS 1.15:85062 ..... N83-32595* #
NAS 1.15:85334 ..... N83-32147* #
NAS 1.15:85335 ..... N83-32143* #
NAS 1.15:85336 ..... N83-32145* #
NAS 1.15:85337 ..... N83-31711* #
NAS 1.15:85394 ..... N83-32353* #
NAS 1.15:85395 ..... N83-32354* #
NAS 1.15:85396 ..... N83-32355* #
NAS 1.15:85397 ..... N83-32369* #
NAS 1.15:85398 ..... N83-32370* #
NAS 1.15:85399 ..... N83-32371* #
NAS 1.15:85400 ..... N83-32356* #
NAS 1.15:85661 ..... N83-32095* #
NAS 1.21:463 ..... N83-32693* #
NAS 1.21:7043(37) N83-32178*
NAS 1.26:166405 ..... N83-31732* #
NAS 1.26:166426 ..... N83-31597* #
NAS 1.26:166487 ..... N83-31723* #
NAS 1.26:166497 ..... N83-31578* #
NAS 1.26:166498 ..... N83-32151* #
NAS 1.26:166501 ..... N83-31731* #
NAS 1.26:166503 ..... N83-31602* #
NAS 1.26:166507 ..... N83-31724* #
NAS 1.26:166511 ..... N83-31586* #
NAS 1.26:166512 ..... N83-32301* #
NAS 1.26:166513 ..... N83-32302* #
NAS 1.26:166514 ..... N83-32150* #
NAS 1.26:166517 ..... N83-31590* #
NAS 1.26:166834 ..... N83-32286* #
NAS 1.26:167974 ..... N83-32687* #
NAS 1.26:168066 ..... N83-31886* #
NAS 1.26:168150 ..... N83-31925* #
NAS 1.26:168151 ..... N83-31926* #
NAS 1.26:168194 ..... N83-32070* #
NAS 1.26:168344 ..... N83-32180* #
NAS 1.26:170831 ..... N83-31744* #
NAS 1.26:170834 ..... N83-32205* #
NAS 1.26:170835 ..... N83-32522* #
NAS 1.26:170836 ..... N83-32069* #
NAS 1.26:170838 ..... N83-31632* #
NAS 1.26:170840 ..... N83-32344* #
NAS 1.26:170843 ..... N83-31635* #
NAS 1.26:170844 ..... N83-31634* #
NAS 1.26:170845 ..... N83-31612* #
NAS 1.26:170846 ..... N83-31818* #
NAS 1.26:171669 ..... N83-32134* #
NAS 1.26:171672 ..... N83-32133* #
NAS 1.26:171680 ..... N83-31705* #
NAS 1.26:172164 ..... N83-31733* #
NAS 1.26:172166 ..... N83-32341* #
NAS 1.26:172172 ..... N83-32352* #
NAS 1.26:172780 ..... N83-31595* #
NAS 1.26:172832 ..... N83-32700* #
NAS 1.26:172833 ..... N83-31576* #
NAS 1.26:172834 ..... N83-32027* #
NAS 1.26:172835 ..... N83-32417 #
NAS 1.26:172836 ..... N83-32529* #
NAS 1.26:172853 ..... N83-32306 #
NAS 1.26:172917 ..... N83-32126* #
NAS 1.26:172918 ..... N83-32127* #
NAS 1.26:172919 ..... N83-32128* #
NAS 1.26:172920 ..... N83-32129* #
NAS 1.26:172921 ..... N83-32130* #
NAS 1.26:172922 ..... N83-32131* #
NAS 1.26:172923 ..... N83-32132* #
NAS 1.26:172924 ..... N83-32135* #
NAS 1.26:172925 ..... N83-32136* #
NAS 1.26:172926 ..... N83-32137* #
NAS 1.26:172927 ..... N83-32138* #
NAS 1.26:172928 ..... N83-32139* #
NAS 1.26:172929 ..... N83-32140* #
NAS 1.26:172930 ..... N83-32141* #
NAS 1.26:172931 ..... N83-32142* #
NAS 1.26:172933 ..... N83-32144* #
NAS 1.26:172940 ..... N83-32146* #
NAS 1.26:172944 ..... N83-31996* #
NAS 1.26:172945 ..... N83-32696* #
NAS 1.26:172947 ..... N83-31714* #
NAS 1.26:172948 ..... N83-31715* #
NAS 1.26:172949 ..... N83-31716* #
NAS 1.26:172950 ..... N83-31717* #
NAS 1.26:172951 ..... N83-31718* #
NAS 1.26:172952 ..... N83-31719* #
NAS 1.26:172955 ..... N83-32657* #
NAS 1.60:2143 ..... N83-31596* #
NAS 1.60:2167 ..... N83-31577* #
NAS 1.60:2182 ..... N83-32044* #
NAS 1.60:2209 ..... N83-31713* #
NAS 1.61:1092-REV ..... N83-31730* #

NASA-CASE-ARC-11368-1 ..... N83-31854*

NASA-CASE-GSC-12517-1 ..... N83-32067*
NASA-CASE-GSC-12614-1 ..... N83-32577*

NASA-CASE-LAR-12602-1 ..... N83-32081*
NASA-CASE-LAR-12728-1 ..... N83-32026*

NASA-CASE-LEW-12443-1 ..... N83-32175*
NASA-CASE-LEW-13171-2 ..... N83-32176*
NASA-CASE-LEW-13401-2 ..... N83-32177*
NASA-CASE-LEW-13429-1 ..... N83-31952*
NASA-CASE-LEW-14586-1 ..... N83-31603*
NASA-CASE-LEW-1335901 ..... N83-31855*

NASA-CASE-MFS-25134-1 ..... N83-31895*
NASA-CASE-MFS-25215-1 ..... N83-31953*

NASA-CASE-NPO-14525-2 ..... N83-31918*
NASA-CASE-NPO-14567-1 ..... N83-31919*
NASA-CASE-NPO-14596-3 ..... N83-31896*
NASA-CASE-NPO-14936-1 ..... N83-32232*
NASA-CASE-NPO-14940-1 ..... N83-31954*
NASA-CASE-NPO-15251-1 ..... N83-31897*
NASA-CASE-NPO-15304-1 ..... N83-31743*
NASA-CASE-NPO-15342-1 ..... N83-32342*
NASA-CASE-NPO-15400-1 ..... N83-31993*
NASA-CASE-NPO-15453-1 ..... N83-32515*
NASA-CASE-NPO-15522-1 ..... N83-32516*

NASA-CASE-13343-2 ..... N83-31795*

NASA-CR-166405 ..... N83-31732* #
NASA-CR-166426 ..... N83-31597* #
NASA-CR-166487 ..... N83-31723* #
NASA-CR-166497 ..... N83-31578* #
NASA-CR-166498 ..... N83-32151* #
NASA-CR-166501 ..... N83-31731* #
NASA-CR-166503 ..... N83-31602* #
NASA-CR-166507 ..... N83-31724* #
NASA-CR-166511 ..... N83-31586* #
NASA-CR-166512 ..... N83-32301* #
NASA-CR-166513 ..... N83-32302* #
NASA-CR-166514 ..... N83-32150* #
NASA-CR-166517 ..... N83-31590* #
NASA-CR-166834 ..... N83-32286* #
NASA-CR-167974 ..... N83-32687* #
NASA-CR-168066 ..... N83-31886* #
NASA-CR-168150 ..... N83-31925* #
NASA-CR-168151 ..... N83-31926* #
NASA-CR-168194 ..... N83-32070* #
NASA-CR-168344 ..... N83-32180* #
NASA-CR-170831 ..... N83-31744* #
NASA-CR-170834 ..... N83-32205* #
NASA-CR-170835 ..... N83-32522* #
NASA-CR-170836 ..... N83-32069* #
NASA-CR-170838 ..... N83-31632* #
NASA-CR-170840 ..... N83-32344* #
NASA-CR-170843 ..... N83-31635* #
NASA-CR-170844 ..... N83-31634* #
NASA-CR-170845 ..... N83-31612* #
NASA-CR-170846 ..... N83-31818* #
NASA-CR-171669 ..... N83-32134* #
NASA-CR-171672 ..... N83-32133* #
NASA-CR-171680 ..... N83-31705* #
NASA-CR-172164 ..... N83-31733* #
NASA-CR-172166 ..... N83-32341* #
NASA-CR-172172 ..... N83-32352* #
NASA-CR-172780 ..... N83-31595* #
NASA-CR-172832 ..... N83-32700* #
NASA-CR-172833 ..... N83-31576* #
NASA-CR-172834 ..... N83-32027* #
NASA-CR-172835 ..... N83-32417 #
NASA-CR-172836 ..... N83-32529* #
NASA-CR-172853 ..... N83-32306 #
NASA-CR-172917 ..... N83-32126* #
NASA-CR-172918 ..... N83-32127* #
NASA-CR-172919 ..... N83-32128* #
NASA-CR-172920 ..... N83-32129* #
NASA-CR-172921 ..... N83-32130* #
NASA-CR-172922 ..... N83-32131* #
NASA-CR-172923 ..... N83-32132* #
NASA-CR-172924 ..... N83-32135* #
NASA-CR-172925 ..... N83-32136* #
NASA-CR-172926 ..... N83-32137* #
NASA-CR-172927 ..... N83-32138* #
NASA-CR-172928 ..... N83-32139* #
NASA-CR-172929 ..... N83-32140* #
NASA-CR-172930 ..... N83-32141* #
NASA-CR-172931 ..... N83-32142* #
NASA-CR-172933 ..... N83-32144* #
NASA-CR-172940 ..... N83-32146* #
NASA-CR-172944 ..... N83-31996* #
NASA-CR-172945 ..... N83-32696* #
NASA-CR-172947 ..... N83-31714* #
NASA-CR-172948 ..... N83-31715* #
NASA-CR-172949 ..... N83-31716* #
NASA-CR-172950 ..... N83-31717* #
NASA-CR-172951 ..... N83-31718* #
NASA-CR-172952 ..... N83-31719* #
NASA-CR-172955 ..... N83-32657* #

NASA-RP-1092-REV ..... N83-31730* #

NASA-SP-463 ..... N83-32693* #
NASA-SP-7043(37) N83-32178*
NASA-SP-7047 ..... N83-32671*

NASA-TM-77083 ..... N83-31579* #
NASA-TM-77249 ..... N83-31956* #
NASA-TM-77263 ..... N83-32277* #
NASA-TM-82538 ..... N83-32690* #
NASA-TM-82540 ..... N83-31712* #
NASA-TM-84366 ..... N83-32676* #
NASA-TM-84385 ..... N83-31957* #
NASA-TM-84386 ..... N83-32397* #
NASA-TM-84629 ..... N83-31636* #
NASA-TM-84640 ..... N83-32028* #
NASA-TM-84664 ..... N83-32518* #
NASA-TM-85023 ..... N83-32695* #
NASA-TM-85062 ..... N83-32595* #
NASA-TM-85334 ..... N83-32147* #
NASA-TM-85335 ..... N83-32143* #
NASA-TM-85336 ..... N83-32145* #
NASA-TM-85337 ..... N83-31711* #
NASA-TM-85394 ..... N83-32353* #
NASA-TM-85395 ..... N83-32354* #
NASA-TM-85396 ..... N83-32355* #
NASA-TM-85397 ..... N83-32369* #
NASA-TM-85398 ..... N83-32370* #
NASA-TM-85399 ..... N83-32371* #
NASA-TM-85400 ..... N83-32356* #
NASA-TM-85661 ..... N83-32095* #

NASA-TP-2143 ..... N83-31596* #
NASA-TP-2167 ..... N83-31577* #
NASA-TP-2182 ..... N83-32044* #
NASA-TP-2209 ..... N83-31713* #

NAVHLTHRSCHC-83-11 ..... N83-32309 #

NAVTRAEQUIPC-79-C-0076-1 ..... N83-31615 #

NBS-GCR-83-422 ..... N83-31915 #

NBS-TN-910-5 ..... N83-32231 #

NBSIR-82-2550-A ..... N83-32562 #
NBSIR-82-2566 ..... N83-32394 #
NBSIR-82-2574 ..... N83-31883 #
NBSIR-82-2576 ..... N83-32042 #
NBSIR-82-2577 ..... N83-31789 #
NBSIR-82-2625 ..... N83-32349 #
NBSIR-82/2474 ..... N83-32187 #
NBSIR-82/2553 ..... N83-31884 #
NBSIR-83-2639 ..... N83-32395 #
NBSIR-83-2664 ..... N83-31882 #
NBSIR-83-2667 ..... N83-32285 #

NCAR/CT-71 ..... N83-32257 #

NCAR/TN-202 ..... N83-32702 #
NCAR/TN-204 ..... N83-32256 #

NCEL-CR-83.023 ..... N83-32217 #
NCEL-CR-83.025 ..... N83-32181 #

NDAK(1)-A-061-NDAK(1) ..... N83-32168 #

NEAR-TR-283 ..... N83-32004 #

NEPRF-CR-83-03 ..... N83-32233 #

NMERI-8.13-TA8-25 ..... N83-32097 #

NOAA-DR-ERL-GLERL-20 ..... N83-32250 #

NOAA-NWS-CRCP-6 ..... N83-32258 #

NOAA-TM-NMFS-SWFC-24 ..... N83-32675 #

NOAA-TM-NWS-AR-35 ..... N83-32166 #

NOAA-TM-NWS-NHC-19 ..... N83-32255 #

NOAA-83031001 ..... N83-32166 #
NOAA-83031401 ..... N83-32250 #
NOAA-83040101 ..... N83-32675 #
NOAA-83041805 ..... N83-32258 #

NOCC/JTWC-TN-82-2 ..... N83-32235 #

NORDA-TN-179 ..... N83-32268 #
NORDA-TN-187 ..... N83-32152 #
NORDA-TN-197 ..... N83-32267 #

NOSC/TR-848 ..... N83-32468 #

NPL-AC-102 ..... N83-32517

NPL-DES-75 ..... N83-31955

NPL-DITC-13/82 ..... N83-32093
NPL-DITC-20/83-PT-1 ..... N83-31921
NPL-DITC-21/83-PT-2 ..... N83-31922
NPL-DITC-22/83 ..... N83-31923
NPL-DITC-23/83 ..... N83-32405

NPL-MOM-82 ..... N83-32094

NPL-QU-65 ..... N83-32479

NPS-55-83-006 ..... N83-32437 #
NPS-012-83-001PR ..... N83-32663 #

NPS63-83-001 ..... N83-32241 #
NPS63-83-002 ..... N83-32239 #
NPS67-83-001 ..... N83-31757 #
NPS71-83-001 ..... N83-32441 #

NRC-20936 ..... N83-32071 #
NRC-21066 ..... N83-31608 #

NRL-MR-4698 ..... N83-32596 #
NRL-MR-4950 ..... N83-32526 #
NRL-MR-5029 ..... N83-32050 #
NRL-MR-5063 ..... N83-32027* #
NRL-MR-5067 ..... N83-31825 #
NRL-MR-5078 ..... N83-32060 #
NRL-MR-5085 ..... N83-31587 #
NRL-MR-5099 ..... N83-32703 #

NRL-8622 ..... N83-31924 #
NRL-8675 ..... N83-31720 #
NRL-8676 ..... N83-31941 #
NRL-8685 ..... N83-32520 #
NRL-8687 ..... N83-32428 #

NSF/MEA-82017 ..... N83-31914 #

NSMRL-998 ..... N83-32315 #

NSWC-TR-81-264 ..... N83-32264 #

NTNF-0243-09164 ..... N83-32253 #
NTNF-0243-09164 ..... N83-32254 #
NTNF-0243-09164 ..... N83-32275 #

NUREG/CR-2675-VOL-2 ..... N83-32576 #
NUREG/CR-2767 ..... N83-32243 #
NUREG/CR-2836-VOL-1-PT-2 ..... N83-32118 #
NUREG/CR-2836-VOL-4 ..... N83-32115 #
NUREG/CR-2840 ..... N83-32270 #
NUREG/CR-2865 ..... N83-31775 #
NUREG/CR-2909 ..... N83-32223 #
NUREG/CR-2910 ..... N83-32565 #
NUREG/CR-2917 ..... N83-32158 #
NUREG/CR-2932/1 ..... N83-31980 #
NUREG/CR-2939 ..... N83-32013 #
NUREG/CR-2942 ..... N83-31979 #
NUREG/CR-2959-813-1165 ..... N83-31726 #
NUREG/CR-2967 ..... N83-32521 #
NUREG/CR-2991 ..... N83-32222 #
NUREG/CR-3021 ..... N83-32226 #
NUREG/CR-3055 ..... N83-32159 #
NUREG/CR-3167 ..... N83-32010 #

NUSC-TR-6757 ..... N83-32423 #
NUSC-TR-6773 ..... N83-31930 #
NUSC-TR-6879 ..... N83-31942 #
NUSC-TR-6913 ..... N83-32410 #

ONR-TR-8 ..... N83-32306 #

ORNL-C-2-83 ..... N83-32406 #

ORNL/MIT-349 ..... N83-32016 #

ORNL/TM-7898 ..... N83-32597 #
ORNL/TM-7962 ..... N83-31777 #
ORNL/TM-8452 ..... N83-32035 #
ORNL/TM-8519 ..... N83-32521 #
ORNL/TM-8547 ..... N83-32535 #

OUEL-1460/83 ..... N83-32514 #
OUEL-1462/83 ..... N83-31610
OUEL-1465/83 ..... N83-32404 #

OWRT-A-040-FLA(1) ..... N83-32163 #
OWRT-A-046-WVA(1) ..... N83-32165 #
OWRT-A-050-ORE(2) ..... N83-32249 #
OWRT-A-053-ME(1) ..... N83-32201 #
OWRT-A-061 ..... N83-32168 #
OWRT-A-066-CAL(1) ..... N83-32200 #
OWRT-A-080-IDA(1) ..... N83-32172 #
OWRT-A-086-IDA(1) ..... N83-32170 #
OWRT-A-126-MONT(1) ..... N83-32174 #

OWRT-B-066-MASS(2) ..... N83-32204 #
OWRT-B-112-IND(5) ..... N83-32171 #
OWRT-B-123-VA(1) ..... N83-32173 #
OWRT-B-185-UT(1) ..... N83-32164 #

OWRT-C-00155-T(1483)(1) ..... N83-32167 #

PAM-108 ..... N83-32436 #
PAM-132 ..... N83-32381 #

PB83-113852 ..... N83-32669 #
PB83-161307 ..... N83-32248 #
PB83-174599 ..... N83-32162 #
PB83-175232 ..... N83-32249 #
PB83-175307 ..... N83-32163 #
PB83-175315 ..... N83-32164 #
PB83-175612 ..... N83-31915 #
PB83-175638 ..... N83-32702 #
PB83-175687 ..... N83-32562 #
PB83-175737 ..... N83-32250 #
PB83-175760 ..... N83-32394 #
PB83-176024 ..... N83-32228 #
PB83-176032 ..... N83-32229 #
PB83-177832 ..... N83-31790 #
PB83-177840 ..... N83-31791 #
PB83-177857 ..... N83-32025 #
PB83-177865 ..... N83-31792 #
PB83-178129 ..... N83-32200 #
PB83-178137 ..... N83-32165 #
PB83-178665 ..... N83-31850 #
PB83-178681 ..... N83-31789 #
PB83-178699 ..... N83-31883 #
PB83-178764 ..... N83-31911 #
PB83-178913 ..... N83-31909 #
PB83-178921 ..... N83-32075 #
PB83-179002 ..... N83-32349 #
PB83-179135 ..... N83-31910 #
PB83-179697 ..... N83-32251 #
PB83-180034 ..... N83-32185 #
PB83-180133 ..... N83-32166 #
PB83-180208 ..... N83-31851 #
PB83-180224 ..... N83-32042 #
PB83-180232 ..... N83-31892 #
PB83-180265 ..... N83-31912 #
PB83-180661 ..... N83-32202 #
PB83-181487 ..... N83-31853 #
PB83-181743 ..... N83-32252 #
PB83-181958 ..... N83-32204 #
PB83-182006 ..... N83-32172 #
PB83-182022 ..... N83-32201 #
PB83-182055 ..... N83-32167 #
PB83-182121 ..... N83-32168 #
PB83-182303 ..... N83-31793 #
PB83-182501 ..... N83-32161 #
PB83-183145 ..... N83-31794 #
PB83-183632 ..... N83-32253 #
PB83-183731 ..... N83-32254 #
PB83-183806 ..... N83-32275 #
PB83-184077 ..... N83-32255 #
PB83-184085 ..... N83-32276 #
PB83-184309 ..... N83-32169 #
PB83-184382 ..... N83-32231 #
PB83-184507 ..... N83-32066 #
PB83-184671 ..... N83-31852 #
PB83-184689 ..... N83-32043 #
PB83-184697 ..... N83-31992 #
PB83-185330 ..... N83-32186 #
PB83-185348 ..... N83-32187 #
PB83-185553 ..... N83-31884 #
PB83-185595 ..... N83-31885 #

PB83-186213 ..... N83-32120 #
PB83-186361 ..... N83-32674 #
PB83-186445 ..... N83-32174 #
PB83-186627 ..... N83-32170 #
PB83-186692 ..... N83-31913 #
PB83-186734 ..... N83-31616 #
PB83-186890 ..... N83-32256 #
PB83-187120 ..... N83-32173 #
PB83-187153 ..... N83-32171 #
PB83-187336 ..... N83-32396 #
PB83-187351 ..... N83-31917 #
PB83-187799 ..... N83-31916 #
PB83-187849 ..... N83-32257 #
PB83-187955 ..... N83-31914 #
PB83-188623 ..... N83-31893 #
PB83-188680 ..... N83-32203 #
PB83-189464 ..... N83-32675 #
PB83-191064 ..... N83-32274 #
PB83-191098 ..... N83-32395 #
PB83-191114 ..... N83-32285 #
PB83-192039 ..... N83-32670 #
PB83-194415 ..... N83-32258 #
PB83-195099 ..... N83-32230 #
PB83-195107 ..... N83-31894 #

PME-FM-82-2 ..... N83-32003 #

PMT-EM-0003-83 ..... N83-32665 #
PMT-EM-0004-83 ..... N83-32664 #

PNL-SA-9939 ..... N83-32194 #
PNL-SA-10154 ..... N83-32532 #
PNL-SA-10335 ..... N83-31831 #
PNL-SA-10368 ..... N83-31776 #
PNL-SA-10545 ..... N83-31830 #
PNL-SA-10560 ..... N83-31784 #
PNL-SA-10691 ..... N83-32531 #
PNL-SA-10917 ..... N83-32195 #

PNL-4241-VOL-2 ..... N83-32576 #
PNL-4276 ..... N83-32155 #
PNL-4346 ..... N83-32159 #
PNL-4427 ..... N83-32158 #

POLY-M/AE-83-4 ..... N83-32584 #

PPPL-1936 ..... N83-32600 #
PPPL-1947 ..... N83-31829 #
PPPL-1951 ..... N83-32605 #

PPSP/PPRP-76 ..... N83-32251 #

PR-9 ..... N83-31914 #

PREPRINT-568 ..... N83-32458 #

PT-8052 ..... N83-32180* #

PUB-129 ..... N83-32204 #

PWRRC-TR-147 ..... N83-32171 #

QPR-2 ..... N83-32143* #
QPR-3 ..... N83-32142* #

QR-1 ..... N83-31965 #
QR-1 ..... N83-32128* #
QR-3 ..... N83-32146* #
QR-5 ..... N83-31786 #
QR-5 ..... N83-32616 #
QR-16 ..... N83-32624 #

QTPR-7 ..... N83-31595* #

RADC-TM-83-1 ..... N83-32380 #

RADC-TR-82-151 ..... N83-31943 #
RADC-TR-82-269 ..... N83-31939 #
RADC-TR-82-287 ..... N83-31933 #
RADC-TR-83-2 ..... N83-31570 #
RADC-TR-83-6 ..... N83-32308 #
RADC-TR-83-9 ..... N83-32052 #

RAE-TRANS-2104 ..... N83-32287 #

RCA-PRRL-83-CCR-4 ..... N83-32056 #

REPT-2-32300/3R-53434-VOL-1 ..... N83-31632* #
REPT-3 ..... N83-32584 #
REPT-75 ..... N83-32168 #
REPT-82-4 ..... N83-32098 #
REPT-83-2 ..... N83-32310 #
REPT-83-4 ..... N83-32311 #
REPT-83HV004 ..... N83-31818* #
REPT-83SRD024 ..... N83-32618 #
REPT-1378-51-6-2939 ..... N83-31591 #

REPT-1982-10 ..... N83-31581 #
REPT-017816-1-F ..... N83-31974 #
REPT-019651-1-F ..... N83-31932 #

RFP-TRANS-352 ..... N83-31881 #
RFP-TRANS-357 ..... N83-31762 #
RFP-TRANS-368 ..... N83-31770 #
RFP-TRANS-383 ..... N83-31875 #

RFP-3363 ..... N83-32247 #

RHO-BW-SA-214-P ..... N83-32225 #

RI-RD83-163 ..... N83-32070* #

RPT-POD-1982-5 ..... N83-32384 #

RR-211 ..... N83-31991 #
RR-212 ..... N83-32393 #
RR-213 ..... N83-32459 #
RR-217 ..... N83-32460 #

RSG/RCC-317-83-VOL-3 ..... N83-31708 #
RSG/RCC-317-83-VOL-4 ..... N83-31707 #

RU-TR-157-MAE-F ..... N83-31999 #

S-REPT-98-152 ..... N83-32678 #

SAD-102-T ..... N83-32689 #

SAI-84-122-WA ..... N83-32005 #

SAM-TR-82-48 ..... N83-32281 #
SAM-TR-83-1 ..... N83-32293 #
SAM-TR-83-3 ..... N83-32282 #
SAM-TR-83-9 ..... N83-31722 #
SAM-TR-83-13 ..... N83-31945 #

SAND-81-1871 ..... N83-31709 #
SAND-81-2027/1 ..... N83-31980 #
SAND-82-0241C ..... N83-32641 #
SAND-82-0913C ..... N83-31761 #
SAND-82-0917 ..... N83-31775 #
SAND-82-1273C ..... N83-32452 #
SAND-82-1292 ..... N83-32243 #
SAND-82-1384C ..... N83-32564 #
SAND-82-1483C ..... N83-31742 #
SAND-82-1544C ..... N83-31977 #
SAND-82-1650C ..... N83-32034 #
SAND-82-1711C ..... N83-31593 #
SAND-82-1820 ..... N83-32533 #
SAND-82-1847C ..... N83-32640 #
SAND-82-1874C ..... N83-32634 #
SAND-82-1885 ..... N83-32560 #
SAND-82-2021C ..... N83-32569 #
SAND-82-2216C ..... N83-32626 #
SAND-82-2238C ..... N83-32568 #
SAND-82-2481C ..... N83-32625 #
SAND-82-7209C ..... N83-31769 #
SAND-82-8238 ..... N83-32111 #
SAND-82-8798 ..... N83-31767 #
SAND-83-0628C ..... N83-31976 #

SAPR-2 ..... N83-31605 #

SCIENTIFIC-3-APP-B ..... N83-32699 #

SC5291.7FR-VOL-1 ..... N83-31865 #
SC5291.7FR-VOL-2 ..... N83-31864 #

SD-TR-20-VOL-8 ..... N83-31971 #
SD-TR-83-10 ..... N83-32047 #
SD-TR-83-18 ..... N83-31972 #
SD-TR-83-20-VOL-1 ..... N83-31968 #
SD-TR-83-20-VOL-4 ..... N83-31967 #
SD-TR-83-20-VOL-7 ..... N83-31975 #
SD-TR-83-25 ..... N83-32216 #

SEL-80-104-REV ..... N83-32370* #
SEL-81-102-REV ..... N83-32369* #
SEL-81-103 ..... N83-32371* #
SEL-81-205 ..... N83-32355* #
SEL-82-005 ..... N83-32354* #
SEL-82-007 ..... N83-32356* #
SEL-82-008 ..... N83-32353* #

SERI/TP-215-1758 ..... N83-31907 #

SETEC-MME-83-004 ..... N83-31873 #

SEVILLE-TR-83-17 ..... N83-32303 #

SIPL-82-12 ..... N83-31963 #

SO-01-83 ..... N83-32386 #

SR-2 ..... N83-32209 #

SSS-R-83-6089 ..... N83-32210 #

STF34-A82106 ..... N83-31851 #

SU-GL-3520 ..... N83-32509 #

SU-IPR-953 ..... N83-32700* #

SU-SLAC-PUB-2970 ..... N83-32555 #
SU-SLAC-PUB-2984 ..... N83-32065 #
SU-SLAC-PUB-2987 ..... N83-31982 #

SWS-CR-316 ..... N83-32236 #

T-123 ..... N83-32401 #

TACOM-TR-12673 ..... N83-31824 #
TACOM-TR-12703-VOL-1 ..... N83-31899 #
TACOM-TR-12703-VOL-2 ..... N83-31900 #
TACOM-TR-12703-VOL-3 ..... N83-31901 #
TACOM-TR-12703-VOL-4 ..... N83-31902 #

TAEG-TR-141 ..... N83-32347 #

TN-11555-307-8 ..... N83-31578* #

TR-A-21 ..... N83-32467 #

TR-1 ..... N83-31870 #
TR-1-82-ONR ..... N83-32218 #
TR-2 ..... N83-31746 #
TR-2 ..... N83-31749 #
TR-2 ..... N83-31861 #
TR-3 ..... N83-32182 #
TR-4 ..... N83-32032 #
TR-7 ..... N83-32418 #
TR-8-ONR ..... N83-32307 #
TR-13 ..... N83-32058 #
TR-14 ..... N83-32586 #
TR-24 ..... N83-32478 #
TR-26 ..... N83-31751 #
TR-26 ..... N83-31858 #
TR-26 ..... N83-31859 #
TR-26 ..... N83-32438 #
TR-27 ..... N83-31857 #
TR-27 ..... N83-32449 #
TR-28 ..... N83-31856 #
TR-30 ..... N83-31966 #
TR-31 ..... N83-31863 #
TR-33 ..... N83-32527 #
TR-82-43 ..... N83-32430 #
TR-82-65 ..... N83-32431 #
TR-83-6 ..... N83-32461 #
TR-83-01 ..... N83-32429 #
TR-83-001 ..... N83-32402 #
TR-390 ..... N83-32477 #
TR-0083(3902)-1-VOL-1 ..... N83-31968 #
TR-0083(3902)-1-VOL-4 ..... N83-31967 #
TR-0083(3902-04)-1-VOL-7 ..... N83-31975 #
TR-0083(3902-04)-1-VOL-8 ..... N83-31971 #
TR-0083(3930-01)-1 ..... N83-32047 #
TR-0083(3940-04)-1 ..... N83-32216 #
TR-1173-1 ..... N83-32450 #
TR-82411 ..... N83-31589 #

TRW-36060-AR-025 ..... N83-31972 #

TSARCOM-TR-83-1 ..... N83-32677 #

UARZ/DP/TR-83/ONR-13 ..... N83-32305 #

UCID-19473 ..... N83-32451 #
UCID-19563-8 ..... N83-32392 #
UCID-19642 ..... N83-32246 #
UCID-19675 ..... N83-32536 #

UCRL-53315 ..... N83-32567 #
UCRL-53346 ..... N83-32221 #
UCRL-53364 ..... N83-31781 #
UCRL-87201-REV-1 ..... N83-31949 #
UCRL-87432 ..... N83-31950 #
UCRL-87491 ..... N83-32606 #
UCRL-87551 ..... N83-32242 #
UCRL-87802 ..... N83-32224 #
UCRL-88040 ..... N83-32530 #
UCRL-88179 ..... N83-31860 #
UCRL-88224 ..... N83-32609 #
UCRL-88240 ..... N83-31741 #
UCRL-88278 ..... N83-32348 #
UCRL-88315 ..... N83-32558 #
UCRL-88321 ..... N83-31877 #
UCRL-88329 ..... N83-32566 #

UDR-TR-82-03-VOL-1 ..... N83-31606 #
UDR-TR-82-03-VOL-2 ..... N83-31738 #
UDR-TR-82-118 ..... N83-31739 #
UDR-TR-82-154 ..... N83-32078 #
UDR-TR-83-21 ..... N83-32615 #

UILU-ENG-82-2554 ..... N83-32062 #

UNH-MP-T/DR-SG-83-2 ..... N83-32276 #

URC-TR-82-05 ..... N83-31998 #

UROCHESTER/DC/83/TR-33 ..... N83-32059 #

US-PATENT-APPL-SN-135038 ..... N83-31954*
US-PATENT-APPL-SN-163122 ..... N83-31603*
US-PATENT-APPL-SN-163837 ..... N83-32232*
US-PATENT-APPL-SN-165910 ..... N83-31518*
US-PATENT-APPL-SN-180230 ..... N83-31919*
US-PATENT-APPL-SN-195226 ..... N83-31895*
US-PATENT-APPL-SN-195227 ..... N83-32577*
US-PATENT-APPL-SN-210506 ..... N83-32081*
US-PATENT-APPL-SN-214361 ..... N83-32067*
US-PATENT-APPL-SN-220212 ..... N83-31952*
US-PATENT-APPL-SN-229233 ..... N83-31855*
US-PATENT-APPL-SN-229239 ..... N83-31897*
US-PATENT-APPL-SN-235797 ..... N83-32175*
US-PATENT-APPL-SN-246774 ..... N83-31993*
US-PATENT-APPL-SN-258623 ..... N83-32342*
US-PATENT-APPL-SN-288267 ..... N83-31854*
US-PATENT-APPL-SN-291131 ..... N83-31953*
US-PATENT-APPL-SN-293418 ..... N83-31795*
US-PATENT-APPL-SN-303671 ..... N83-31896*
US-PATENT-APPL-SN-303672 ..... N83-32516*
US-PATENT-APPL-SN-314929 ..... N83-32515*
US-PATENT-APPL-SN-315587 ..... N83-31743*
US-PATENT-APPL-SN-333537 ..... N83-32176*
US-PATENT-APPL-SN-359388 ..... N83-32177*
US-PATENT-APPL-SN-408575 ..... N83-32026*

US-PATENT-CLASS-24-214 ..... N83-31895*
US-PATENT-CLASS-29-623.5 ..... N83-32176*
US-PATENT-CLASS-44-1SR N83-31743*
US-PATENT-CLASS-60-721 ..... N83-32515*
US-PATENT-CLASS-60-721 ..... N83-32516*
US-PATENT-CLASS-62-48 ..... N83-31897*
US-PATENT-CLASS-62-295 ..... N83-32026*
US-PATENT-CLASS-62-514 R N83-32026*
US-PATENT-CLASS-62-514R N83-31897*
US-PATENT-CLASS-65-22 ..... N83-31896*
US-PATENT-CLASS-65-142 ..... N83-31896*
US-PATENT-CLASS-65-214 ..... N83-31896*
US-PATENT-CLASS-73-84.4 ..... N83-31993*
US-PATENT-CLASS-73-505 ..... N83-32515*
US-PATENT-CLASS-73-505 ..... N83-32516*
US-PATENT-CLASS-73-818 ..... N83-32081*
US-PATENT-CLASS-73-822 ..... N83-32081*
US-PATENT-CLASS-73-856 ..... N83-32081*
US-PATENT-CLASS-73-860 ..... N83-32081*
US-PATENT-CLASS-73-861.05 ..... N83-31954*
US-PATENT-CLASS-104-282 ..... N83-32067*
US-PATENT-CLASS-104-290 ..... N83-32067*
US-PATENT-CLASS-136-249 ..... N83-32177*
US-PATENT-CLASS-201-17 ..... N83-31743*
US-PATENT-CLASS-244-159 ..... N83-31895*
US-PATENT-CLASS-248-636 ..... N83-32026*
US-PATENT-CLASS-248-638 ..... N83-32026*
US-PATENT-CLASS-250-203R N83-32232*
US-PATENT-CLASS-250-311 ..... N83-31919*
US-PATENT-CLASS-250-573 ..... N83-31993*
US-PATENT-CLASS-264-5 ..... N83-31896*
US-PATENT-CLASS-264-9 ..... N83-31896*
US-PATENT-CLASS-308-10 ..... N83-32067*
US-PATENT-CLASS-310-12 ..... N83-32067*
US-PATENT-CLASS-310-306 ..... N83-32175*
US-PATENT-CLASS-315-3 ..... N83-31952*
US-PATENT-CLASS-315-4 ..... N83-31952*
US-PATENT-CLASS-315-5 ..... N83-31952*
US-PATENT-CLASS-315-5.35 ..... N83-31952*
US-PATENT-CLASS-315-5.38 ..... N83-31952*
US-PATENT-CLASS-318-800 ..... N83-31953*
US-PATENT-CLASS-318-803 ..... N83-31953*
US-PATENT-CLASS-318-809 ..... N83-31953*
US-PATENT-CLASS-324-73R N83-31919*
US-PATENT-CLASS-324-466 ..... N83-31954*
US-PATENT-CLASS-337-14 ..... N83-31897*
US-PATENT-CLASS-343-5CM N83-31918*
US-PATENT-CLASS-343-9PS N83-31918*
US-PATENT-CLASS-356-222 ..... N83-32232*
US-PATENT-CLASS-356-353 ..... N83-32577*
US-PATENT-CLASS-356-363 ..... N83-32577*
US-PATENT-CLASS-356-394 ..... N83-31919*
US-PATENT-CLASS-357-30 ..... N83-32177*
US-PATENT-CLASS-364-200 ..... N83-32342*
US-PATENT-CLASS-364-900 ..... N83-32342*
US-PATENT-CLASS-367-88 ..... N83-31918*
US-PATENT-CLASS-374-51 ..... N83-32081*

US-PATENT-CLASS-415-1 ..... N83-31603*
US-PATENT-CLASS-415-47 ..... N83-31603*
US-PATENT-CLASS-415-175 ..... N83-31603*
US-PATENT-CLASS-415-178 ..... N83-31603*
US-PATENT-CLASS-425-6 ..... N83-31896*
US-PATENT-CLASS-427-34 ..... N83-31855*
US-PATENT-CLASS-427-219.2 ..... N83-31855*
US-PATENT-CLASS-427-318 ..... N83-31795*
US-PATENT-CLASS-427-405 ..... N83-31855*
US-PATENT-CLASS-427-419.2 ..... N83-31795*
US-PATENT-CLASS-427-423 ..... N83-31855*
US-PATENT-CLASS-428-450 ..... N83-31795*
US-PATENT-CLASS-428-469 ..... N83-31795*
US-PATENT-CLASS-428-623 ..... N83-31855*
US-PATENT-CLASS-428-633 ..... N83-31855*
US-PATENT-CLASS-428-641 ..... N83-31795*
US-PATENT-CLASS-428-650 ..... N83-31795*
US-PATENT-CLASS-428-678 ..... N83-31855*
US-PATENT-CLASS-428-680 ..... N83-31795*
US-PATENT-CLASS-429-144 ..... N83-32176*
US-PATENT-CLASS-429-251 ..... N83-32176*
US-PATENT-CLASS-429-254 ..... N83-32176*
US-PATENT-CLASS-548-413 ..... N83-31854*
US-PATENT-CLASS-548-415 ..... N83-31854*

US-PATENT-4,335,190 ..... N83-31855*
US-PATENT-4,338,061 ..... N83-31603*
US-PATENT-4,338,568 ..... N83-31954*
US-PATENT-4,344,787 ..... N83-31896*
US-PATENT-4,355,311 ..... N83-31918*
US-PATENT-4,355,896 ..... N83-32232*
US-PATENT-4,358,732 ..... N83-31919*
US-PATENT-4,366,680 ..... N83-31897*
US-PATENT-4,371,596 ..... N83-32176*
US-PATENT-4,373,142 ..... N83-32175*
US-PATENT-4,374,183 ..... N83-31795*
US-PATENT-4,376,872 ..... N83-32177*
US-PATENT-4,381,583 ..... N83-31895*
US-PATENT-4,387,935 ..... N83-32067*
US-PATENT-4,391,129 ..... N83-31993*
US-PATENT-4,391,609 ..... N83-31743*
US-PATENT-4,393,706 ..... N83-32516*
US-PATENT-4,393,708 ..... N83-32515*
US-PATENT-4,393,716 ..... N83-32081*
US-PATENT-4,394,610 ..... N83-31953*
US-PATENT-4,394,726 ..... N83-32342*
US-PATENT-4,394,819 ..... N83-32026*
US-PATENT-4,395,123 ..... N83-32577*
US-PATENT-4,395,557 ..... N83-31854*
US-PATENT-4,395,656 ..... N83-31952*

USAAEFA-81-01-5 ..... N83-31601 #

USAAVRADCOM-TR-82-D-37 ..... N83-31572 #
USAAVRADCOM-TR-82-D-42 ..... N83-31589 #
USAAVRADCOM-TR-83-F-5 ..... N83-31868 #

USAFA-TR-83-2 ..... N83-31571 #

USARIEM-M-16/83 ..... N83-32299 #
USARIEM-M-19/83 ..... N83-32300 #
USARIEM-M-20/83 ..... N83-32296 #

USARIEM-M15/83 ..... N83-32294 #
USARIEM-M21/83 ..... N83-32298 #

USCG-D-05-83 ..... N83-31588 #

USGS/WRD-WRI-83-006 ..... N83-32162 #

USGS/WRD/WRI/83-007 ..... N83-32169 #

USGS/WRI-82-44 ..... N83-32162 #
USGS/WRI-82-48 ..... N83-32169 #

UTMSE-83-1 ..... N83-31736 #

UWRL/P-82/07 ..... N83-32164 #

VEDA-113425-82U/P0707 ..... N83-31615 #

WAPD-TM-1518 ..... N83-32351 #

WHOI-83-2 ..... N83-32274 #

WP-8022 ..... N83-32474 #
WP-8219 ..... N83-32403 #

WPS-8029 ..... N83-32435 #

WRRC-PUB-86 ..... N83-32163 #

WRRI-77 ..... N83-32249 #

WSS/CI-82-69 ..... N83-31767 #

W83-02178 ..... N83-32249 #
W83-02185 ..... N83-32163 #
W83-02186 ..... N83-32164 #
W83-02232 ..... N83-32200 #
W83-02233 ..... N83-32165 #
W83-02321 ..... N83-32204 #
W83-02326 ..... N83-32172 #
W83-02328 ..... N83-32201 #
W83-02362 ..... N83-32167 #
W83-02404 ..... N83-32173 #
W83-02408 ..... N83-32171 #
W83-02487 ..... N83-32170 #
W83-02491 ..... N83-32174 #

Y/IA-156 ..... N83-31988 #

YM-13-04419 ..... N83-32132* #

☆ U.S. GOVERNMENT PRINTING OFFICE: 1983—421-564/320

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
OKLAHOMA
University of Oklahoma, Bizzell Library
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an '*' following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library and Information Center
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati and Hamilton County Public Library
Cleveland Public Library
Dayton Public Library
Toledo and Lucas County Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols '#' and '*' from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business

Penalty for Private Use, $300

SPECIAL FOURTH CLASS MAIL
Book

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451

POSTMASTER: If Undeliverable (Section 158
Postal Manual) Do Not Return